

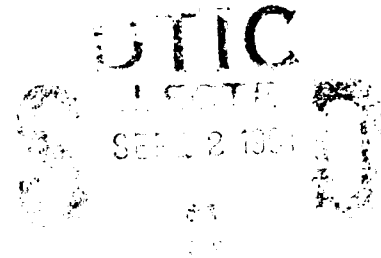
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# NAVAL POSTGRADUATE SCHOOL

Monterey, California



## THESIS

THE FEASIBILITY OF SPECIALIZED SUBCOMMUNITIES  
WITHIN THE  
GENERAL UNRESTRICTED LINE OFFICER COMMUNITY

by

Lori Foster Turley

September, 1990

Thesis Advisor:

Paul R. Milch

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THE FEASIBILITY OF  
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GENERAL UNRESTRICTED LINE OFFICER COMMUNITY

by

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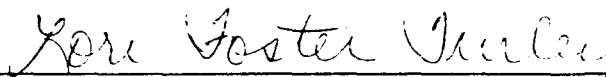
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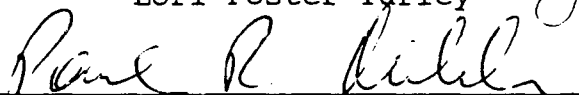
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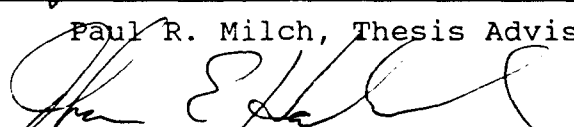
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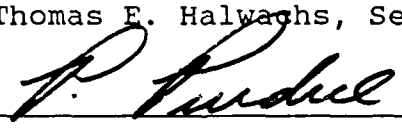
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## ABSTRACT

This thesis analyzes the feasibility of reorganizing the General Unrestricted Line community into six specialized sub-communities, while maintaining the requirements for leadership and subspecialty development prescribed by the current career path. FORECASTER, an interactive personnel flow model was used in the analysis. Steady state analysis was conducted for each sub-community to determine long term feasibility. Transient analysis was conducted to determine if feasibility could be achieved in a reasonably short period of time. The results of the analysis indicate that while reorganization into sub-communities is theoretically feasible it is not practical in the short term.

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## I. INTRODUCTION

### A. BACKGROUND

Career planning is essential to any large organization. It not only benefits the individual members of the organization by providing them with career goals, but also improves the efficiency of the organization by using personnel assets in the most effective manner possible.

The United States Navy is just one example of an organization in which career planning is crucial to overall management. The severe budget constraints of today place even more importance on efficiency, particularly in the costly area of personnel. In addition, maintaining an all-volunteer force requires that the career needs of individuals be met. The availability of a well-structured career may be incentive for individuals to join and/or remain on active duty in the Navy.

The Navy organizes its officers into a number of specialized communities. Most of these communities have a specific mission, a set of billets to be filled only by the members of the community, a fairly rigid career path and a community manager who monitors the community's efforts to meet goals and maintain stability. This management structure appears to be very effective; the communities have, for the most part, successfully met their missions year after year.

The Navy's General Unrestricted Line (GEN URL) community, a relatively new community, seems to have achieved a lesser degree of success than others in managing its officers. The GEN URL is not as structured as most other communities. Since its inception, it has undergone numerous changes in its size, structure, career path and goals. Although vast improvements to the community have been made, additional changes may still be required in order to maximize the effectiveness of the community. The history of the GEN URL community, including the development of the GEN URL career path, will be presented in more detail in Chapter II.

#### **B. THESIS OBJECTIVES**

This thesis addresses the issue of career planning within the GEN URL community specifically. An alternative approach to organizing the community (i.e., the creation of specialized sub-communities) in order to improve the effectiveness of the officers is proposed and analyzed. The analysis illustrates a means by which the GEN URL community can be modeled. Its purpose is to determine whether or not the suggested reorganization is generally feasible, and to determine what changes must be made and how much time is required to attain feasibility. FORECASTER, a personnel flow model, was used in the analysis.



### C. ORGANIZATION OF THE THESIS

As stated above, background information regarding the GEN URL community is provided in Chapter II. Chapter III is a discussion of the methodology used for the analysis, including a brief description of the FORECASTER model. The results of the analysis are presented in Chapter IV. Chapter V is a summary of the findings of this thesis, followed by conclusions and recommendations.

## II. THE GENERAL UNRESTRICTED LINE COMMUNITY

### A. HISTORY OF THE GEN URL COMMUNITY

Prior to 1972, all Surface Warfare, Submarine Warfare and non-warfare Unrestricted Line officers were assigned a designator of 110X. During that year, the Surface and Submarine officers were redesignated 111X and 112X, respectively, leaving only the non-warfare officers, mostly females, in the 110X community. These officers were not considered to be a separate community; they were detailed by the Surface community to primarily 1000-coded billets, which could be filled by any unrestricted line officer. Officers in the 110X community at this time did not have a specific career path, as did their warfare counterparts, but they were eligible for a limited number of command billets ashore. In 1974, a formal career path was established for 110X officers. It essentially provided them with a general framework or progression of billet types leading to command ashore, focusing on leadership development and subspecialty expertise. It was not as rigid as the warfare communities' career paths; rather, it allowed for flexibility in terms of timing and types of assignments.

During the next fifteen years, the 110X community gradually moved closer to attaining community status. In

1981, the 110X community was named the General Unrestricted Line Community (GEN URL). A community manager billet was established the following year, and a community sponsor, the Deputy Chief of Naval Operations (Manpower, Personnel and Training) (OP-01), was assigned. A separate GEN URL detailing organization was established in 1987. In 1989, the GEN URL community was provided with a unique mission. As stated in The Naval Officers' Career Planning Guidebook,

The mission of the General Unrestricted Line Community is to provide the Navy with a community of officers of proven leadership, shore management and subspecialty expertise who manage the increasingly complex fleet support establishment in direct support of the Navy's warfighting mission.  
[Ref. 1:p. 12]

The GEN URL career path was re-assessed during a 1984 Study on Progress of Women in the Navy [Ref. 2]. As a result of this study, a dual career path was created, as shown in Figure 2.1. This provided an opportunity for a limited number of GEN URL officers at the rank of Lieutenant Commander and above to pursue only a specialist field rather than follow the more traditional track. The specialist track did not require that certain leadership tours be completed as a prerequisite for promotion, as did the generalist track. However, this specialist option did not attract a sufficient number of officers, and in 1989, the GEN URL career path returned to its original generalist version (Figure 2.2).

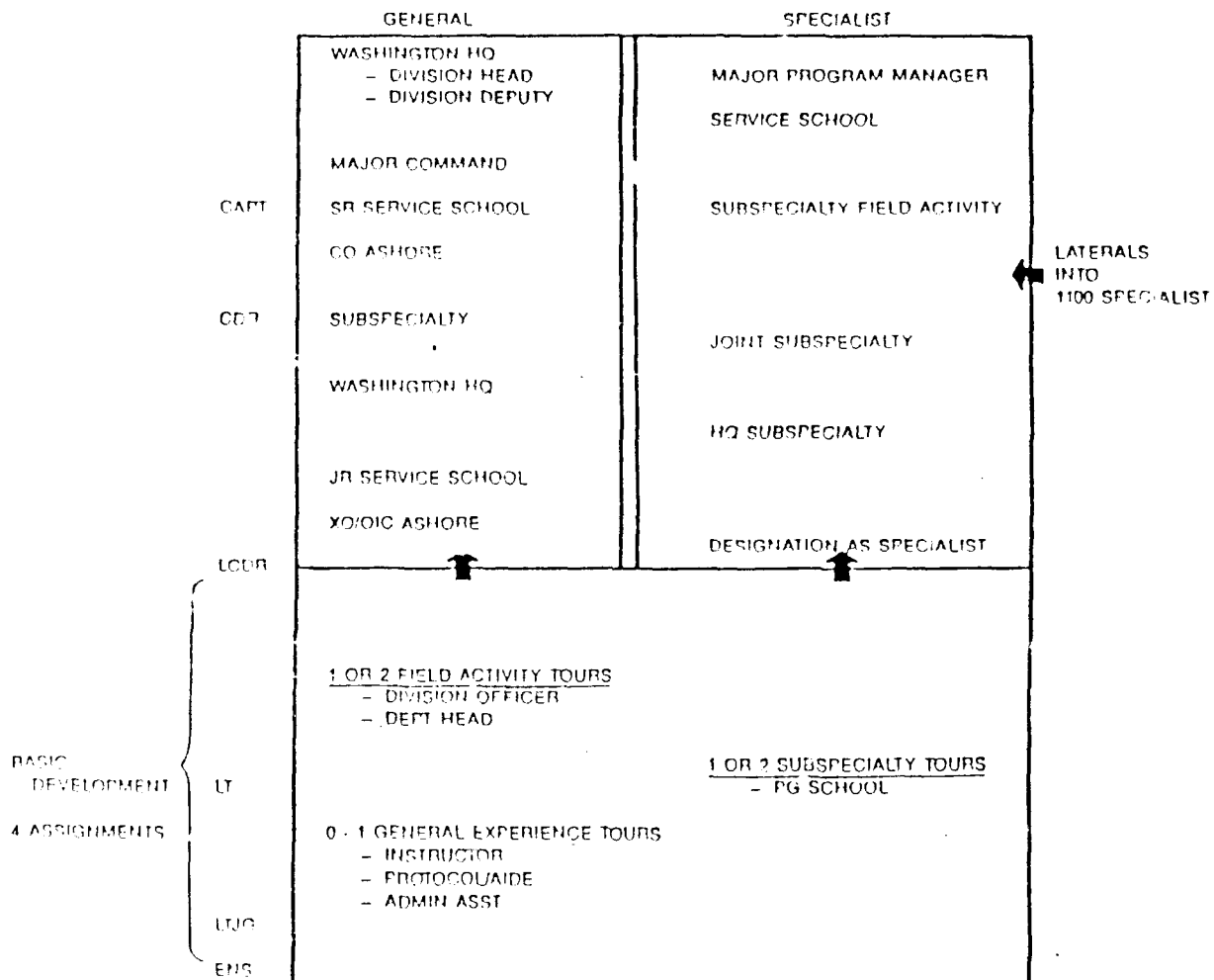


Figure 2.1  
GEN URL Dual Track Career Path

YCS			
CAPT	24	COMMAND AND PROVEN	2-3 TOURS
	22		
CDR	20	SUBSPEC	2-3 TOURS
	18		
	16		
	14		
LCDR	12	MID GRADE LDRSHIP/ SUBSPEC DEVELOPMENT	2-3 TOURS
	10		
	8		
LT	6	BASIC LDRSHIP/ SUBSPEC DEVELOPMENT	3-5 TOURS
	4		
LTJG	2		
ENS	0		

PRIMARY CAREER MILESTONE:  
 \* MAJOR SHORE COMMAND TOUR  
 OPTIONS INCLUDE:  
 BONUS 0-6 CMD TOUR; SR PME (NOTE 1);  
 SUBSPECIALTY TOUR; MAJOR SERVICE/JOINT  
 STAFF TOUR (NOTES 2/3)

PRIMARY CAREER MILESTONES:  
 \* COMMANDER COMMAND TOUR  
 \* JOINT SPECIALIST DESIGNATION  
 \* SUBSPECIALTY UTILIZATION  
 OPTIONS INCLUDE:  
 BONUS 0-5 XO TOUR; SR PME (NOTE 1);  
 SUBSPECIALTY TOUR; MAJOR SERVICE/  
 JOINT STAFF TOUR (NOTES 2/3)

PRIMARY CAREER MILESTONES:  
 \* XO TOUR  
 \* PROVEN SUBSPECIALIST  
 OPTIONS INCLUDE:  
 JR PME (NOTE 1); SUBSPECIALTY TOUR;  
 MAJOR SERVICE/JOINT STAFF TOUR  
 (NOTES 2/3)

PRIMARY CAREER MILESTONES:  
 \* DIVISION OFFICER TOUR  
 \* DEPARTMENT HEAD TOUR  
 \* SUBSPECIALTY DEVELOPMENT  
 THRU EXPERIENCE TOURS  
 AND/OR NAVY POST  
 GRADUATE SCHOOL  
 OPTIONS INCLUDE:  
 GENERAL EXPERIENCE TOUR

Figure 2.2  
 Current GEN URL Career Path

## **B. THE GEN URL COMMUNITY TODAY**

The General Unrestricted Line Community today consists of several distinct groups of officers: those who entered the community upon commissioning, lateral transfers from other communities, nuclear power instructors, Naval Academy coaches, officers who are HIV-positive, and officers awaiting acceptance to professional schools (e.g., medical school). The latter four groups are not included in this study, as they do not follow the traditional 110X career path. The remaining two groups consist of approximately 2500 officers, 93 percent of whom are female. The first group consists only of women; they are accessed from the U.S. Naval Academy, Naval Reserve Officer Training Corps, and Officer Candidate School. Male GEN URL officers are transferees from other communities. The second group, then, consists of both men and women; some transferred to the GEN URL community by choice, while others are attrites from warfare communities or warfare training programs. Until 1989, all attrites were automatically redesignated 110X when they failed to complete the programs to which they were previously assigned. Often they are not "career" officers; that is, they are not competitive for promotion within the GEN URL community. This is evident when average promotion rates for female GEN URL Captains (O-6), Commanders (O-5) and Lieutenant Commanders (O-4) are compared to average promotion rates for all GEN URL officers of the

same respective ranks. Table 2.1, which was provided by the Community Manager, illustrates that inclusion of males results in a significant reduction in promotion opportunity, particularly at the O-4 and O-6 levels.

**TABLE 2.1**  
**GENERAL UNRESTRICTED LINE**  
**AVERAGE PROMOTION RATES**

RANK	FEMALES ONLY	OVERALL
O-6	55.0%	37.4%
O-5	70.5%	65.5%
O-4	80.9%	66.1%

In view of this observation, and in order to avoid any hidden biases in available data, male GEN URL officers are excluded from the analysis conducted for this thesis. It must be noted, however, that the results of the analysis probably apply to all "career" General Unrestricted Line officers, male and female.

GEN URL officers are assigned primarily to 1000-coded billets. These billets are located throughout the world at a variety of activity types, and in a wide variety of occupational fields. As stated previously, these billets do not belong exclusively to the GEN URL Community; they can be filled by any Unrestricted Line Officers. Some billets

provide specific opportunities for leadership, such as the Division Officer, Department Head, or Executive Officer tours, and in most cases they are so designated by Additional Qualification Designators (AQD). Other billets are in particular subspecialization fields; this is normally indicated by either an AQD or a Subspecialty Code. Some billets provide both leadership and subspecialty experience, while others are general experience assignments.

As of April 1990, approximately ten percent of all GEN URL officers were assigned to billets with designators other than 1000. Sixty percent of these billets are normally reserved for officers with warfare qualifications, while the remainder belong to the Restricted Line, Staff Corps, Limited Duty Officer and Warrant Officer Communities. These assignments often occur when officers with the required designators are not available to fill the billets, and commands prefer filling the billets with GEN URL officers to leaving them vacant. Although the percentage of 110X officers that are not assigned to 1000 billets is significant, it has shown a steady decrease during recent years. There are two major causes of the decrease. First, numerous warfare billets have been reviewed and subsequently recoded to 1000 when it was determined that the requirement for a warfare qualified officer was unrealistic or unnecessary. Second, the GEN URL detailers have been making a concerted effort to assign 110X officers



only to 1000-coded billets. This trend is likely to continue until assignment of GEN URL officers to non-1000 billets is virtually non-existent.

### **C. THE CURRENT GEN URL CAREER PATH**

As stated previously, the GEN URL career path provides members of the community with broad guidelines in terms of types and timing of assignments for a successful career. The career path requires that officers complete a sequence of leadership tours at specific levels of responsibility, as well as subspecialty tours, in order to remain competitive. There is no requirement for these two types of tours to be related to one another in terms of functional area. In fact, it is not unusual for an officer who has acquired a high degree of expertise in a particular subspecialty field to be assigned to a job in a completely unrelated field for the purpose of fulfilling a leadership requirement. The result of this is that the Navy loses the officer's experience and knowledge not only for the length of the disassociated tour, but also for the length of time required to bring the officer up to speed upon her return to the subspecialty field. The latter is particularly significant in areas of rapidly developing technology. Other officers may never develop expertise in any one single area due to shifting between a variety of fields.

This practice is often viewed as poor and inefficient use of officer manpower. This was probably the opinion of the creators of the short-lived dual career path which allowed some officers to specialize throughout their careers. However, even though the problem has been recognized, a solution has not yet been found.

#### **D. A PROPOSAL FOR A REORGANIZATION OF THE GEN URL COMMUNITY**

One possible and somewhat obvious solution to the problem of inefficient use of GEN URL officers' specialized skills is a combination of the generalist and specialist tracks of the career path which previously co-existed. Leadership tours and specialist tours would be interrelated; that is, officers would be able to meet all leadership requirements within their respective fields of expertise. The career path itself would be essentially unchanged from its present form. However, the community would be reorganized into a number of specialized sub-communities. The fact that this has not been implemented raises the question of feasibility. Perhaps the billet structure and/or the GEN URL personnel inventory does not allow it. This thesis will address these issues in an attempt to determine the feasibility of such a solution.

In order to test this proposal, analysis of each of the primary functional areas to which GEN URL officers are assigned was required. It was determined, based on

information provided by the GEN URL Community Manager as well as a review of 1000 billets, that six functional areas should be considered. They are:

- Personnel/Administration
- Surveillance
- Logistics/Shore Operations
- Education and Training
- Communications/Automated Data Processing (ADP)
- Intelligence/National Security Affairs (NSA)

Each of these categories was analyzed to determine whether or not it could stand alone as a sub-community within which a viable career path is available for GEN URL officers, providing them with the required subspecialty and leadership opportunities.

### III. METHODOLOGY

#### A. DATA

In order to obtain data required for modeling the GEN URL community, a "snapshot" of all 110X officers and the billets they were filling as of March 1990 was taken from the Body and Billet System (BABS) file. Those officers who do not normally follow the established GEN URL career path as described in Chapter II, Section B, were then deleted from the file so that only female "career" officers remained for the analysis. Because BABS does not contain all the required data fields, the Officer Master File (OMF) of 30 September 1989 was also used as a source of data regarding officers included in the analysis.

Two key assumptions were made with regard to the data. First, since the GEN URL Community does not have its own set of billets, the billets filled by GEN URL officers at the time of the snapshot are assumed to be representative of the billets filled by the community at any given time. Second, it is assumed that all billets are correctly coded for leadership and subspecialty.

## B. MODEL DESCRIPTION

FORECASTER, the computer model to be used in the analysis, was developed by Milch [Ref. 3] in 1988 for use in forecasting the distribution of military officers. It was coded in APL (A Programming Language) for use on the Naval Postgraduate School (NPS) IBM 3033 mainframe computer. The model was used in two NPS theses to analyze the effects of the Goldwater-Nichols Department of Defense Reorganization Act on Navy officer communities; Johnson [Ref. 4] modeled the Surface Warfare Officer (SWO) Community and Drescher [Ref. 5] modeled the Tactical Aviation (TACAIR) Community. Johnson also constructed a user-friendly interactive shell around the model. Drescher provided more detailed documentation for the model. In 1990 Milch [Ref. 6] modified and further improved the model by simplifying its mathematical structure and also increasing its computational speed. FORECASTER is now available for use on personal computers with APL software.

For this thesis, FORECASTER was adapted for use for the General Unrestricted Line Community. The underlying structure of the model is unchanged in the GEN URL version, but there is a significant difference in the way the model is used. The SWO and TACAIR versions each modeled the entire community, whereas the GEN URL version looks at each one of the six primary functional areas of the community separately. This procedural change is necessary to test whether or not each of

these sub-communities provides a feasible career path for GEN URL officers.

The theoretical and mathematical details of FORECASTER are described in Milch [Refs. 3 and 6], while a description from an applied perspective is available in Johnson [Ref 4]. The following explanation focuses on the GEN URL application of the model.

There are six variables required by the model. Each of these are described below, along with any peculiarities to the GEN URL version of the model. A data set comprised of all six variables is required for each of the six primary functional areas available to GEN URL officers, as listed in Chapter II, Section D. In other words, there will be six separate submodels in the GEN URL model.

### **1. Activities**

Activities are the types of assignments available to officers in the system during the course of their careers. In most warfare communities, officers follow a career path comprised of a progression of sea duty billets and shore duty billets. Similarly in the GEN URL community, officers are assigned to a progression of leadership and subspecialty billets. The specific criterion by which billets should be divided into activity types depends on the issue being analyzed within the community. Based on this fact, the

activities in the GEN URL version of FORECASTER are divided into the following categories:

- Subspecialty
- Leadership
- Subspecialty and Leadership
- General Experience

Subspecialty (SUBSPEC) billets are those billets which provide (only) subspecialty experience and may require officers with subspecialty experience in a particular functional area as indicated by subspecialty or AQD codes. Postgraduate education quotas are included in this category.

Leadership (LDRSHP) billets provide (only) leadership experience, which is indicated by an AQD code, a particular NOBC code, or a billet title indicating leadership (e.g., Executive Officer).

Leadership and Subspecialty (S/L) billets provide both subspecialty and leadership experience, and may require an officer with subspecialty experience, in accordance with the assigned subspecialty or AQD codes.

General Experience (GENEXP) billets provide neither subspecialty nor leadership experience, and therefore have no subspecialty or AQD codes assigned. These billets may provide generalized experience within a functional area, joint

experience, or Joint Professional Military Education (JPME).

These activity categories are the same for each functional area.

## **2. Tours and Tour Lengths**

The career of a U.S. Navy officer is a succession of tours of varying lengths. In modeling the GEN URL career path, twelve tours are used to represent the career length of an officer who reaches the rank of Captain and may have served as Commanding Officer of a major command. It is assumed that all officers leave the "system" at the completion of the twelfth tour.

Tour length is the number of time units that an officer spends in a particular type of billet during a particular tour in his or her career. Here, the unit of time is a quarter of a year (or three months) and it is assumed that all tour lengths are given in integer numbers of quarters. The tour lengths used should be considered to be average tour lengths derived from the GEN URL career path shown in Figure 2.2. For example, according to the guidance provided by the career path, a GEN URL officer should complete three to five tours during the first ten years of her career. It is therefore assumed that, on the average, an officer completes four tours during this period, each of ten quarters duration. The tour lengths of the remaining tours are computed in a similar fashion. The result is that tours five



and six are also assumed to be ten quarters long, while tours seven through twelve are assumed to be eight quarters long each. The tour lengths, in the case of the GEN URL model, do not vary from one activity category to another, since tour length normally does not depend on whether a billet is a Leadership billet or a Subspecialty billet, or any other category. Rather, it is determined by factors such as whether a tour is overseas or in the continental United States, or whether or not the officer is accompanied by her family. These tour lengths are organized in the form of a 4 by 12 matrix where rows represent activity categories and columns represent tours. The matrix is the same for each of the six sub-communities since tour length is not dependent upon functional area.

### **3. Accessions**

Accessions are officers entering the "system". They appear in the model in the accessions matrix, in the activity (row) and tour number (column) in which they enter. In the GEN URL version of FORECASTER, the "system" is the functional area or sub-community under consideration. Accessions into a sub-community enter as newly commissioned ensigns; they enter the system always at tour one.

Potential lateral entries into the GEN URL community used to be attrites from the warfare communities. However, since automatic redesignation to 110X of warfare attrites no

longer occurs, the number of officers entering the GEN URL from other communities has decreased markedly. According to the community manager, the number of lateral transfers into the community is expected to approximately equal the number of lateral transfers out of the community in the future. For this reason, this potential source of accessions was not accounted for explicitly in the model.

In summary, accessions are represented in the form of a 4 by 12 matrix of numbers.

#### **4. Billets**

FORECASTER allows for consideration of two types of billets, represented by two separate matrices: Hard Billets, which must be filled by personnel in the system, and additional Soft Billets, which may be filled by personnel in the system. Together, these two types of billets account for all billets available to officers in the system. The rows of these matrices represent the activities, and the columns represent the tour numbers.

As stated in Chapter II, the GEN URL community does not have its own set of billets; they fill the portion of the 1000 billets assigned to the community by the Officer Allocation and Distribution Branch of the Navy Military Personnel Command (NMPC-454). Because this is not a specific subset of the 1000 billet base, but rather a constantly changing set, only a representative set of billets can be used

for modeling purposes. Here, it was assumed that the billets currently being filled by GEN URL officers are representative of the billets filled by the community at any given time. All of the billets are considered as "hard" billets; the Soft Billet matrix is not used.

In order to develop the Hard Billet matrix, billets were first placed in one of the six functional areas, based on the subspecialty codes, AQD codes, Navy Officer Billet Classification (NOBC) codes, and in some cases, billet titles and activity names of the billets. The assignment of specific codes to functional areas is shown in Appendix A. Approximately two percent of the billets being filled by GEN URL officers did not fall into any of the six functional areas under consideration. These billets included billets coded other than 1000, as well as 1000-coded billets in a variety of functional areas other than the six examined in this study. Since none of these additional areas had a sufficient number of billets to be considered a separate sub-community, and since this group is a very small part of the overall billet set, these billets were not included in the analysis.

Within each of the six categories, billets were further classified into the four activity types on the basis of the same billet codes and information used for the first classification. Since billet data is available in terms of grade, or rank, rather than tour number, non-leadership

billets were converted to tour number on the basis of billet grade, as shown in Table 3.1. Leadership billets, on the other hand, were converted to tour number on the basis of the level of leadership experience as shown in Table 3.2.

**TABLE 3.1**

**BILLET TO TOUR NUMBER CONVERSIONS  
(NON-LEADERSHIP BILLETS)**

<b>BILLET GRADE</b>	<b>TOUR NUMBER</b>
L (O-1)	1
K (O-2)	2
J (O-3)	3 and 4
I (O-4)	5 and 6
H (O-5)	7, 8 and 9
G (O-6)	10, 11 and 12

**TABLE 3.2**

**BILLET TO TOUR NUMBER CONVERSIONS  
(LEADERSHIP BILLETS)**

<b>LEVEL OF LEADERSHIP</b>	<b>TOUR NUMBER</b>
Division Officer	1 and 2
Department Head	3 and 4
Executive Officer	5 and 6
Commander Command	7, 8 and 9
Major Command	10, 11 and 12

## **5. Incumbents**

Incumbents are the officers currently in the "system", that is, before forecasting commences. The incumbents matrix places the officers in the matrix locations representing the types of billets they are filling, at the proper points in their respective careers. To accomplish this for the GEN URL model, officers were first placed in one of the six functional area categories, and then into activity types according to their respective billets. Officers serving in billets that are not included in any of the six sub-communities are excluded from the steady state analysis (see Chapter IV, Section B). However, officers in this group who are proven subspecialists or have postgraduate degrees in one of the functional areas under consideration are included in the transient analysis, as explained in Chapter IV, Section C. Officers who are currently not assigned to valid billets, or who are attending schools other than JPME or postgraduate institutions are not included in the analysis, as it is assumed that the number of officers currently in this situation are representative of the number in this situation at any given time.

The activity types represent the rows of each incumbents matrix. Four numbers represent the columns of the

matrix. In summary, incumbents are represented in the form of a 4 by 12 matrix of numbers.

#### **6. Transition Probabilities**

There are eleven transition probability matrices in the model which represent the flow of personnel in the system among activity categories, from one tour to the next tour. The first matrix represents the flow from tour one to tour two, the second matrix represents the flow from tour two to tour three, and so on to the eleventh matrix, representing the flow from tour eleven to tour twelve.

The probabilities of transition for the GEN URL model were derived from a combination of attrition rates, Executive Officer and Commanding Officer screen opportunities, guidance provided by the career path and billet availabilities. Attrition rates are implicit in the model. They are the difference between one and the sum of the transition probabilities in a given row. The actual attrition rates used were converted from current (as of 30 June 1990) continuation rates by year group to attrition rates by tour number. It was assumed that these rates do not vary between sub-communities, nor between activity types, as there is no evidence to the contrary. Thus, the rates were applied uniformly across all functional areas and activities.

In summary, probabilities of transition are represented in the form of eleven 4 by 4 matrices.

### C. ASSUMPTIONS

In order to model any officer community, a number of assumptions must be made with regard to the data, the structure of the community and the specific application of the model. A summary of the assumptions made for the GEN URL version of FORECASTER follows. More detailed discussions of the assumptions are located at various places throughout the thesis.

- Billets are coded and named correctly.
- Billets filled by GEN URL officers at the time of the "snapshot" are representative of the GEN URL share of 1000-coded billets.
- A career is 12 tours in length, and all officers still in the system after 12 tours will leave at that time.
- Tour lengths may be expressed in terms of integer numbers of quarters.
- The first six tours are each ten quarters in length, and the last six tours are each eight quarters in length, regardless of activity category or sub-community.
- Officers are accessed into the GEN URL community in the first tour only.
- Officers are accessed into a sub-community proportional to the number of billets in the sub-community.
- Officers are accessed into activity types of a sub-community proportional to the available billets in each activity type.
- The number of lateral transfers into the GEN URL community is negligible.

- Attrition does not vary between activity categories.
- Attrition does not vary between sub-communities.
- Division Officer tours occur during Tours 1 and 2 only.
- Department Head tours occur during Tours 3 and 4 only.
- Executive Officer tours occur during Tours 5 and 6 only.
- Commanding Officer tours occur during Tours 7, 8 and 9 only.
- Major Command tours occur during Tours 10, 11 and 12 only.
- The probabilities of transition computed for the model are a fair representation of actual transition proportions in which officers transfer among activity categories when moving from one tour to the next.



#### **IV. ANALYSIS**

##### **A. STARTING VALUES FOR MODEL PARAMETERS**

Prior to forecasting, the parameter values for each sub-community model must be determined. The following is an explanation of these starting values for the largest of the six sub-communities, Personnel/Administration. Values for the remaining sub-communities were derived in the same manner, using data for each particular sub-community. Those values are available in Appendix B.

It is important to note that the numbers used in the analysis are meaningful not so much in absolute terms, but rather in comparative terms. The fact that the GEN URL community, even more so than most Navy officer communities, is in a constant state of flux in terms of size and structure makes absolute numbers virtually meaningless in this sort of analysis. It is possible, however, to draw significant conclusions from trends and relative results.

##### **1. Tour Lengths**

As stated in Chapter III, Section B.2, the length of each tour was derived from the career path shown in Table 2.2. The specific tour lengths used in the analyses of all six GEN URL sub-communities are shown in Table 4.1.

TABLE 4.1

## TOUR LENGTHS (QUARTERS)

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	10	10	10	10	10	10	8	8	8	8	8	8
LDRSHP	10	10	10	10	10	10	8	8	8	8	8	8
S/L	10	10	10	10	10	10	8	8	8	8	8	8
GENEXP	10	10	10	10	10	10	8	8	8	8	8	8

## 2. Billets

The Billet matrix for each sub-community is based on actual billet data acquired from the "snapshot" described in Chapter III, Section A. The Billet matrix for the Personnel/Administration sub-community is shown in Table 4.2. Billet matrices for all sub-communities are available in Appendix B.

**TABLE 4.2****PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
BILLETS**

<b>BILLET TYPES</b>	<b>TOUR NUMBERS</b>											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	10	22	22	29	28	8	7	7	2	2	1
LDRSHP	17	192	99	98	58	25	12	6	5	0	0	0
S/L	0	11	3	3	1	0	0	0	0	1	0	0
GENEXP	5	39	86	86	47	48	8	8	7	3	3	2

**3. Incumbents**

For the steady state analysis (Section B), all entries in the Incumbents matrix are assumed to be zeros. Running the model to steady state means forecasting far enough into the future that all officers in the system at the start of forecasting pass completely through the system by the end of the forecasting period. The entries in the Incumbents matrix are therefore irrelevant to the results of steady state forecasting.

For transient analysis, the starting incumbents matrix is first identical to the starting billet matrix shown in Table 4.2, and then modified as is explained in Section C.

**4. Accessions**

It is assumed that officers are accessed into activity types of a sub-community in the first tour proportional to the

Personnel/Administration sub-community, 77.3 percent of all first tour billets are LDRSHP billets, 22.7 percent are GENEXP billets, while none are SUBSPEC or S/L. Thus, it is assumed that of all first tour accessions, the percentages assigned to SUBSPEC, LDRSHP, S/L and GENEXP are, respectively, zero percent, 77.3 percent, zero percent and 22.7 percent.

For steady state forecasting, the total number of first tour accessions for each sub-community is the number that results in the smallest change to the current size of the sub-community after 108 quarters of forecasting. In short term forecasting, the total number changes as required to attain or maintain feasibility in a given sub-community.

The Accessions matrix used initially in running the Personnel/Administration sub-community model to steady state is shown in Table 4.3. Starting Accessions matrices for all sub-communities are shown in Appendix B.

**TABLE 4.3**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**ACCESSIONS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	10	0	0	0	0	0	0	0	0	0	0	0
S/L	0	0	0	0	0	0	0	0	0	0	0	0
GENEXP	3	0	0	0	0	0	0	0	0	0	0	0

### 5. Transition Probabilities

As stated in Chapter III, transition probabilities are derived from attrition rates, Executive Officer and Commanding Officer screen opportunities, guidance provided by the career path and billet availabilities. The attrition rate from each tour is assumed to be the same for all four billet types. Further, attrition rates are assumed to be the same for each sub-community.

Attrition rates were computed from data for FY 89 beginning and ending inventory by years of service (YOS), provided by the GEN URL Community Manager. The ending inventory for each YOS was subtracted from the corresponding beginning inventory to obtain the number of attrites from each YOS group. The attrition rate for a particular tour number was computed by dividing the total number of attrites for the

years comprising that tour by the total beginning inventory for that tour. For example, since Tour 7 has a tour length of eight quarters, and it occurs after 15 YOS (the sum of tour lengths of the first six tours), the attrition rate for Tour 7 is computed by dividing the sum of the attrites from 16 YOS and 17 YOS by the sum of the beginning inventories for 16 YOS and 17 YOS.

In the case of tours with non-integer tour lengths, it is assumed that half of the officers in the split YOS group are in the earlier of the two tours, and the remaining half are in the later tour. Similarly, it is assumed that half of the attrites from the split YOS group attrite during the earlier tour, and half attrite during the later tour. Tour 1 is an example of this situation since its tour length is 10 quarters, or two and a half years. The beginning inventories for the first three YOS are 135, 138, and 136, respectively. The number of attrites are 1, 5, and 4, respectively. Only half, or 68, of the officers in the third YOS are assumed to be in Tour 1 and only half, or two, of the attrites from this YOS are assumed to attrite from Tour 1. Therefore, the attrition rate is computed as:

$$\frac{1 + 5 + 2}{135 + 138 + 68} = 0.023.$$

Attrition rates for all tours are shown in Table 4.4.

**TABLE 4.4**  
**ATTRITION RATES**

TOUR NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
ATTRITION RATE	.023	.052	.072	.045	.089	.016	.037	.029	.316	.067	.000	100.0

The probabilities of transition used in the GEN URL model are keyed on the requirements and opportunities for completion of leadership tours. An explanation of the derivation of these probabilities follows. Specific numbers used in the explanation are from the Personnel/Administration sub-community model. Probabilities of transition for all sub-communities are available in Appendix B.

It is assumed for the purposes of the GEN URL model that all Division Officer (DIVOFF) tours, regardless of the sub-community, are completed during the first and second tours only, and that an officer can do no more than one DIVOFF tour. In other words, an officer must complete a DIVOFF tour in either Tour 1 or Tour 2, but not in both. Similarly, Department Head (DH) tours must be completed in only Tour 3 or Tour 4, Executive Officer (XO) tours in only Tour 5 or Tour 6, Commander Command (CO) tours in only Tour 7 or Tour 8 or Tour 9, and Major Command tours in only Tour 10 or Tour 11 or Tour 12.

**a. Transitions from Tour 1 to Tour 2**

All those officers in non-leadership (SUBSPEC or GENEXP) billets in the first tour, unless they attrite from the system, **must** go to LDRSHP or S/L billets in Tour 2. Here, the continuation rate (one minus the rate of attrition) for officers leaving Tour 1 is 97.7 percent. Since the billet data show that 94.6 percent of the Tour 2 Personnel/Administration billets offering Division Officer experience are in the LDRSHP category, the probability that officers in either SUBSPEC or GENEXP billets in Tour 1 will transition to a LDRSHP billet in Tour 2 is computed as  $(0.977)(0.946) = 0.924$ . Therefore, in general, the probability of transitioning to a DIVOFF billet in Tour 2 from a non-leadership billet in Tour 1 is equal to: (continuation rate) X (proportion of DIVOFF billets that are LDRSHP billets).

Similarly, since 5.4 percent of the DIVOFF billets in Tour 2 are in the S/L category, the probability of transition to be entered into the matrix for officers leaving a SUBSPEC billet or a GENEXP billet in Tour 1 and going to a S/L billet in Tour 2 is  $(0.977)(0.054) = 0.053$ .

All officers in leadership billets in Tour 1, if they continue in the system, **must** go to non-leadership billets in Tour 2 since two tours at one level of leadership is not permitted. Since 20.4 percent of the non-leadership Tour 2 billets are SUBSPEC and 79.6 percent are GENEXP, then officers



leaving either LDRSHP billets or S/L billets and continuing in the system will transition to non-leadership billets in these proportions.

The transition probability matrix for transferring from Tour 1 to Tour 2 is shown in Table 4.5.

**TABLE 4.5**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.924	0.053	0.000
LDRSHP	0.199	0.000	0.000	0.778
S/L	0.199	0.000	0.000	0.778
GENEXP	0.000	0.924	0.053	0.000

**b. Transitions from Tour 2 to Tour 3**

Upon completion of the second tour, every officer in the system being modeled has completed a DIVOFF tour and is therefore eligible for assignment to a Department Head tour, as well as any other type of tour. Consequently, probabilities of transition from all types of billets in Tour 2 to any one particular type of billet in Tour 3 are all the same. All rows in this transition probability matrix are therefore identical.

The DH tour will be completed in either Tour 3 or Tour 4. It is assumed that 50 percent of all DH billets are in the third tour. Therefore, 50 percent of the officers who are still in the system must be assigned to DH billets in the third tour. Of these officers, 97.1 percent will go to LDRSHP billets, and 2.9 percent will go to S/L billets, since the DH billets are distributed between these two categories in these percentages. The computation of the probability that any officer transitions to a LDRSHP billet in Tour 3 is the product of the following three quantities:

- (i) continuation rate
- (ii) percentage of DH billets in Tour 3
- (iii) percentage of Tour 3 DH billets in the LDRSHP category

In this particular case, this transition probability is:

$$(0.948)(0.50)(0.971) = 0.460.$$

The probability of transition for officers going to a S/L billet at this time is computed in the same manner, with the percentage of Tour 3 DH billets in the S/L category substituted for (iii) above. Specifically, the transition probability is  $(0.948)(0.50)(0.029) = 0.014$ .

Any officers who do not attrite or go to a DH tour in Tour 3 must go instead to a non-leadership tour. The percentage of officers in this category is computed by subtracting the percentage that went to a DH tour from the

percentage that did not attrite (the continuation rate). The remainder is then multiplied by the proportion of billets in each category of non-leadership billets to obtain the probability of going to each of these two categories. Therefore, the probability of transitioning to a SUBSPEC billet in Tour 3 is  $[0.948 - (0.460 + 0.014)](0.204) = 0.097$  and the probability of transitioning to a GENEXP billet in Tour 3 is  $[0.948 - (0.460 + 0.014)](0.796) = 0.377$ .

The transition probability matrix for transferring from Tour 2 to Tour 3 is shown in Table 4.6.

**TABLE 4.6**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.097	0.460	0.014	0.377
LDRSHP	0.097	0.460	0.014	0.377
S/L	0.097	0.460	0.014	0.377
GENEXP	0.097	0.460	0.014	0.377

**c. Transitions from Tour 3 to Tour 4**

Because Tour 4 is the second and last opportunity for a GEN URL officer to serve in a DH tour, just as Tour 2 was her second and last opportunity to serve in a DIVOFF tour, the transition probabilities for movement from the third to the fourth tour are computed using the same logic as for

computing transition probabilities from the first to the second tour. Here, the continuation rate is 0.928. Of those officers going to a leadership tour in Tour 4, 97.0 percent go to LDRSHP billets and 3.0 percent go to S/L in accordance with the actual distribution of leadership billets. Likewise, of those officers going to non-leadership billets in Tour 4, 20.4 percent go to SUBSPEC billets and 79.6 percent go to GENEXP. The specific values of the computed transition probabilities are shown in Table 4.7.

**TABLE 4.7**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.900	0.028	0.000
LDRSHP	0.189	0.000	0.000	0.739
S/L	0.189	0.000	0.000	0.739
GENEXP	0.000	0.900	0.028	0.000

**d. Transitions from Tour 4 to Tour 5**

With the fourth tour completed, all officers have had a DH tour. Although all are now eligible for an Executive Officer tour, only a certain percentage will be selected for such a tour. The rate used for this application of the model is 65 percent which, according to the GEN URL Community

Manager, has been the actual XO opportunity for the GEN URL community during the last several years. Further, it is assumed that the attrition for officers leaving Tour 4 applies only to those officers who are not selected for an XO tour. Therefore, probabilities of transition from any type of billet in Tour 4 to an XO billet (LDRSHP or S/L) in Tour 5 is computed as the product of the following three quantities:

- (i) XO selection rate;
- (ii) percentage of all XO billets that are in Tour 5;
- (iii) percentage of Tour 5 XO billets that are in the billet category under consideration.

Therefore, since the data show that 70 percent of all XO billets are in Tour 5, and 98.3 percent of the Tour 5 XO billets are in the LDRSHP category, the probability that any officer leaving Tour 4 will go to a LDRSHP billet in Tour 5 is  $(0.65)(0.70)(0.983) = 0.447$ . Similarly, it follows that  $(0.65)(0.70)(0.017) = 0.008$  is the probability that any officer leaving Tour 4 will go to a S/L billet in Tour 5.

The attrition rate from the fourth tour (4.5 percent) is applied to the remaining officers by subtracting the percentage (45.5 percent) of officers who go to XO tours in Tour 5 from the continuation rate (95.5 percent). The remainder is the percentage of officers who go to a non-leadership tour in the fifth tour, or 50.0 percent. They are

distributed among the two types of non-leadership billets according to the proportion of billets in each of these categories, which are 38.2 percent and 61.8 percent, respectively, for SUBSPEC and GENEXP. The results are that 19.1 percent will go to SUBSPEC billets and 30.9 percent will go to GENEXP billets.

Because all officers, regardless of the type of billet they filled in Tour 4, have the same chance of going to a particular type of tour in Tour 5, the rows of the transition probability matrix for transitioning from Tour 4 to Tour 5 are identical. The matrix is shown in Table 4.8.

**TABLE 4.8**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.191	0.447	0.008	0.309
LDRSHP	0.191	0.447	0.008	0.309
S/L	0.191	0.447	0.008	0.309
GENEXP	0.191	0.447	0.008	0.309

**e. Transitions from Tour 5 to Tour 6**

Officers who complete an XO tour in Tour 5 are not eligible for a second XO tour, and therefore must go to only non-leadership billets in Tour 6. Of those who do not attrite

(at a rate of 8.9 percent), 36.8 percent will go to SUBSPEC billets, and 63.2 percent will go to GENEXP billets, since the billets are distributed in these percentages. In other words, the continuation rate is multiplied by each of the billet proportions in order to obtain the probabilities of transition of 0.335 and 0.576 of transiting from leadership to SUBSPEC and GENEXP billets, respectively.

A portion of the officers who filled non-leadership billets in Tour 5 will fill XO billets in Tour 6, their last opportunity to do so. Thirty percent of the 65 percent of the officers who were selected to serve as XO, or 19.5 percent of all officers who left Tour 4, did not have the opportunity to serve as an XO in Tour 5 due to a limited number of XO billets in Tour 5. This group is a certain percentage of all officers who filled non-leadership billets in Tour 5. This percentage must be such that the 50.0 percent of officers who transitioned to a non-leadership billet in Tour 5 multiplied by this unknown percentage should equal the  $(100)(0.65)(0.30)$  percent of officers who will fill XO billets in Tour 6. Thus, the needed percentage must be

$$100 \left[ \frac{(0.65)(0.30)}{(0.500)} \right] = 39.0\%.$$

In other words, 39.0 percent of all officers in non-leadership billets in Tour 5 will go to XO tours in Tour 6, distributed between LDRSHP and S/L billets in accordance with the way in

which the billets themselves are distributed (100 percent and zero percent, respectively). The remaining officers who continue (91.1 percent) will go to non-leadership billets in the proportion of the existing SUBSPEC and GENEXP billets (36.8 percent and 63.2 percent, respectively).

The transition probability matrix for transitioning from Tour 5 to Tour 6 is shown in Table 4.9.

**TABLE 4.9**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.192	0.390	0.000	0.329
LDRSHP	0.335	0.000	0.000	0.576
S/L	0.335	0.000	0.000	0.576
GENEXP	0.192	0.390	0.000	0.329

**f. Transitions from Tour 6 to Tour 7,  
and from Tour 7 to Tour 8**

Commanding Officer tours at the Commander level are available in Tours 7, 8 and 9. The selection rate used for CO is 55 percent, which has been the actual GEN URL CO opportunity in recent years, according to the GEN URL Community Manager. The billet data suggests that CO billets are divided among the three tours such that 50 percent are in Tour 7, and 25 percent are in each of Tour 8 and Tour 9.



The computation of probabilities of transition when going from Tour 6 to Tour 7 and from Tour 7 to Tour 8 is accomplished in the same manner as for transitions from Tour 4 to Tour 5 and from Tour 5 to Tour 6, respectively, with the actual rates changed as required. Specifically, the rates used in these computations are 55 percent selection for CO, and attrition rates of 1.6 percent and 3.7 percent from Tours 6 and 7, respectively. In Tour 7, all of the leadership billets are in the LDRSHP category, while the non-leadership billets are divided evenly between SUBSPEC and GENEXP; officers going to leadership and non-leadership billets in Tour 7 are distributed accordingly. Since all Tour 8 leadership billets are LDRSHP billets, all officers going to leadership tours in Tour 8 go to LDRSHP billets. Since 46.7 percent of the Tour 8 non-leadership billets are SUBSPEC billets, and 53.3 percent are GENEXP billets, officers going to non-leadership billets in Tour 8 are distributed in these proportions.

The transition probability matrices for officers leaving Tours 6 and 7 are shown in Tables 4.10 and 4.11, respectively.

**TABLE 4.10**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.355	0.275	0.000	0.354
LEADERSHIP	0.355	0.275	0.000	0.354
S/L	0.355	0.275	0.000	0.354
GENEXP	0.355	0.275	0.000	0.354

**TABLE 4.11**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.359	0.194	0.000	0.410
LDRSHP	0.450	0.000	0.000	0.513
S/L	0.450	0.000	0.000	0.513
GENEXP	0.359	0.194	0.000	0.410

**g. Transitions from Tour 8 to Tour 9**

Computation of transition probabilities from Tour 8 to Tour 9 becomes slightly more complicated, although the same principle is used here. As stated above, one fourth of the 55 percent of all officers who are selected for CO will complete this tour in Tour 9, which is

$$100[(0.55)(0.25)] = 13.75 \text{ percent}$$

of all officers in the system at the completion of Tour 6. All of these officers must be in non-leadership billets in Tour 8. However, there are officers in non-leadership billets in Tour 8 who are not eligible for a CO tour in Tour 9, because they already served in a CO billet in Tour 7; therefore, the percentage of officers in this category (i.e., Tour 8 and non-leadership billet) who have not yet served in a CO billet must be determined.

Since the attrition rate from Tour 7 was 3.7 percent, then 96.3 percent of all those who completed a CO tour in Tour 7 (namely,  $100[(0.55)(0.50)] = 27.5$  percent) went to a non-leadership billet in Tour 8. This is 26.5 percent, or  $100[(0.963)(0.275)]$ , of the officers who were in the system at the end of Tour 6, just prior to selection to command. As shown in Table 4.10, approximately  $100(0.355 + 0.354)$  percent of officers leaving Tour 6 went to a non-leadership tour in Tour 7. Of these, approximately  $100(0.359 + 0.410)$  percent went to another non-leadership billet in Tour 8, as shown in Table 4.11. Multiplying these two percentages together results in 54.5 percent of all officers who have not served in a CO billet at the time they are transitioning to Tour 9. Adding 54.5 to 26.5 provides the overall percentage (81.0) serving in a non-leadership billet in Tour 8. Since one fourth of the 55 percent selected for command, or 13.75 percent of the overall group must go to a CO billet in Tour 9,

the percentage of those officers in non-leadership billets just prior to this can be determined by solving for x in the equation

$$[(0.265 + 0.545)]x = 0.1375.$$

The solution is  $x = 0.170$ , or 17.0 percent of this group must go to a CO tour in Tour 9. As in previous cases, this group is divided among the two types of billets providing CO experience in accordance with the actual distribution of such billets. Since all of the Tour 9 CO billets are actually in the LDRSHP category, the entire 17.0 percent will go to LDRSHP billets.

Since the attrition rate from Tour 8 is 2.9 percent, 97.1 percent of the officers continue into Tour 9. The 17.0 percent of the officers going to a CO tour in Tour 9 is subtracted from 97.1 percent, and the remainder (80.1 percent) are assigned to SUBSPEC and GENEXP billets. Since, according to the billet data, the Tour 9 non-leadership billets are divided evenly between the SUBSPEC and GENEXP categories, the officers transitioning non-leadership billets in Tour 9 are assigned to these categories in the same proportions.

The officers who completed a CO tour in Tour 8 attrite at the rate of 2.9 percent, and the remaining 97.1 percent go to non-leadership billets. Since 50 percent of the non-leadership billets in Tour 9 are in the SUBSPEC category,

and 50 percent are GENEXP billets, the officers in this group are divided approximately evenly between the two categories.

The transition probability matrix for transitioning from Tour 8 to Tour 9 is shown in Table 4.12.

**TABLE 4.12**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.401	0.170	0.000	0.400
LDRSHP	0.486	0.000	0.000	0.485
S/L	0.486	0.000	0.000	0.485
GENEXP	0.401	0.170	0.000	0.400

**h. Transitions from Tour 9 to Tour 10, Tour 10 to Tour 11 and Tour 11 to Tour 12**

Probabilities of transitioning to Tours 10, 11 and 12, since Major Command tours are the only leadership tours available, are computed in the same manner as transition probabilities for Commanding Officer tours. The selection rate for Major Command that was used in the model is 50 percent, which has been the actual rate in recent years. The attrition rates used were 0.316, 0.067 and zero for Tours 9, 10 and 11, respectively.

The billet data show that, in the Personnel/Administration sub-community, there are no leadership billets

of either type in Tours 10, 11 and 12. In these cases, the percentages of officers going to these types of billets were distributed approximately evenly between the LDRSHP and S/L categories. It is assumed that if leadership billets were available, 50 percent of the officers selected for Major Command would complete this tour in Tour 10, 25 percent would complete it in Tour 11, and 25 percent would complete it in Tour 12.

The transition probability matrices for officers going to Tours 10, 11 and 12 are shown in Tables 4.13, 4.14 and 4.15, respectively.

**TABLE 4.13**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.174	0.125	0.125	0.260
LDRSHP	0.174	0.125	0.125	0.260
S/L	0.174	0.125	0.125	0.260
GENEXP	0.174	0.125	0.125	0.260

TABLE 4.14

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.258	0.144	0.144	0.387
LDRSHP	0.373	0.000	0.000	0.560
S/L	0.373	0.000	0.000	0.560
GENEXP	0.258	0.144	0.144	0.387

TABLE 4.15

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.252	0.122	0.122	0.504
LDRSHP	0.333	0.000	0.000	0.667
S/L	0.333	0.000	0.000	0.667
GENEXP	0.252	0.122	0.122	0.504

**B. STEADY STATE ANALYSIS**

Steady state analysis was conducted for each of the six sub-communities of the GEN URL. In other words, for each sub-community, distribution of personnel was forecasted for 108 quarters, the time required for officers entering the system at the start of the forecasting period to pass completely through the system. The goal of this analysis is to determine

whether or not each sub-community is feasible in terms of providing a viable career path for officers within the sub-community and, in the long run, being able to match officers in the system with billets of corresponding paygrades and levels of responsibility.

The GEN URL version of FORECASTER is structured to model a viable career path for GEN URL officers, consisting of leadership, subspecialty and general experience tours at increasing levels of responsibility. If the results of steady state forecasting show that, in the long run, there is approximately a one-to-one mapping of billets to officers, then both conditions for feasibility are met.

Steady state forecasting for each sub-community was first conducted using the starting values obtained via the procedure described in the preceding section. The specific values of the variables for each sub-community are shown in Appendix B. As stated in Section A.4 above, the number of accessions for each sub-community is the number that results in the smallest change to the current size of the sub-community after 108 quarters of forecasting. The only exception to this is the case when a decrease of even one officer per quarter in the number of accessions results in the inability to fill a particular type of billet in the second tour. For example, there are two accessions per quarter in the Shore Operations/Logistics sub-community (one each in LDRSHP and



GENEXP billets), which result in a 41 percent increase in the current sub-community size. If the accessions were reduced to zero per quarter in the LDRSHP category, there would be no officers available to fill SUBSPEC or GENEXP billets in Tour 2, since these billet categories in the second tour can be filled only by officers who served in LDRSHP or S/L billets in Tour 1. Similarly, if the GENEXP category accessions were reduced to zero officers per quarter, there would be no officers available to fill LDRSHP or S/L billets in Tour 2. The overall number of accessions must therefore remain at two if there is to be any chance for feasibility of the sub-community.

The results of the initial steady state analyses indicate that all six of the GEN URL sub-communities are infeasible with their current structures. Billets cannot be filled as required by the officers in the system in steady state. In general, all sub-communities suffer a shortage of junior officers, that is, officers at the rank of Lieutenant Commander and below serving in, roughly, the first six tours. Further, there is an excess of senior officers in, roughly, Tours 7 through 12. Attempts to remedy these problems in order to attain feasibility were made for each sub-community in the manner described below for the Personnel/Administration sub-community.

The resulting steady state distribution of officers from the initial run of the Personnel/Administration sub-community model is shown in Table 4.16.

**TABLE 4.16**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
EXPECTED NUMBER OF OFFICERS 108 QUARTERS FROM NOW**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	20	12	11	21	28	28	29	30	12	15	12
LDRSHIP	100	28	58	54	50	22	21	11	11	9	4	4
S/L	0	2	2	2	1	0	0	0	0	9	4	4
GENEXP	30	78	48	44	35	48	28	34	30	19	22	24

The general shortage of junior officers and excess of senior officers noted above are obvious when Table 4.16 is compared to Table 4.2 (Personnel/Administration Sub-community Billets). The comparison is made explicit in Table 4.17, where the number of officers less billets is shown. The negative values in Table 4.17 indicate shortages of officers, while the positive values indicate excesses.

**TABLE 4.17**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**

**EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
LESS NUMBER OF HARD BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	10	-10	-11	-8	0	20	22	23	10	13	11
LDRSHP	83	-164	-41	-44	-8	-3	9	5	6	9	4	4
S/L	0	-9	-1	-1	0	0	0	0	0	9	4	4
GENEXP	25	39	-38	-42	-12	0	20	26	23	16	19	22

NEGATIVE VALUES REFLECT PERSONNEL SHORTAGES.  
POSITIVE VALUES REFLECT PERSONNEL EXCESSES.

The above results were examined for areas in which adjustments could be made in an attempt to bring feasibility into reach. The most obvious solution is to shift billets from one tour to another. For example, the excess of officers in Tour 1 LDRSHP billets and the shortage of officers in Tour 2 LDRSHP billets suggest that LDRSHP billets should be moved from Tour 2 to Tour 1. However, in some cases, this type of movement is constrained by the career path. Since Division Officer billets are assumed to be available only in Tours 1 and 2, LDRSHP and S/L billets in Tours 1 and 2 can be moved only between these two tour numbers, and not to any other tour numbers. Likewise, Department Head billets can be moved only from Tour 3 to Tour 4, and vice versa. Similar constraints apply to XO, CO and Major Command billets in their respective

tour numbers. To some extent, these assumptions could be relaxed, in which case more trading between tours would be possible.

The movement between tours of SUBSPEC and GENEXP billets is also constrained to a certain degree. For the model, these billets are assigned to tour numbers based on the grade codes of the billets. Since current assignment policy allows for an officer to be assigned to a billet one grade higher or one grade lower than the officer's paygrade, it is reasonable to assume that billets can be moved one or two tours in either direction, i.e., earlier or later.

Another possible method of attaining feasibility is adjustment of probabilities of transition to channel officers into existing billets, forcing the system to become feasible. This alternative is ruled out for steady state analysis, however, since the current transition probabilities approximately model the current career path. If the probabilities are changed, the career path is changed. For steady state analysis, it is important that the career path remain constant in order to determine whether or not the current career path can be applied to a reorganized community.

Increasing accessions must also be eliminated as a means of alleviating the shortage of officers at the junior officer levels since this would only worsen the problem of excess senior officers. It could be used on a short term basis, but

as a permanent (i.e., steady state) solution, it would result in a significant increase in the overall size of the GEN URL, which is unreasonable in a time of impending defense budget reductions.

In each of the six sub-communities, after the initial run of each model, the billet matrix was altered in an attempt to achieve feasibility. There were two phases to this process. First, the movement of LDRSHP and S/L billets was constrained by the initial assumptions, as described above, while movement of SUBSPEC and GENEXP billets was limited to two tours in either direction from the billets' assigned tour numbers. The results still reveal shortages and excesses of officers at specific levels of leadership (e.g. Division Officer, Department Head, etc.). For the second phase of the process, the constraints on leadership billets were relaxed such that billets could be moved to the tour immediately preceding or immediately following the tour number to which the billet had been originally assigned. This expanded the windows during which certain levels of leadership tours could be completed. However, there is likely to be some resultant effect on selection opportunity for XO and CO tours, the extent of which was not determined here. The key result of the relaxation of the constraints is that billet fills are maximized within the general framework of the career path.

For the first phase of this analysis for the Personnel/ Administration sub-community, 103 billets were moved from the Tour 2 LDRSHP category to the Tour 1 LDRSHP category, compared to what is shown in Table 4.2. This necessitated a redistribution of accessions as compared to Table 4.3 in accordance with the altered distribution of Tour 1 billets, such that 12 officers per quarter were accessed into LDRSHP billets, one was accessed into GENEXP billets, and still none were accessed into the remaining billet categories.

In the SUBSPEC category, ten billets were moved out of Tour 3 and four billets were moved out of Tour 4, all 14 of which were moved into Tour 2. Additionally, eight SUBSPEC billets were shifted from Tour 5 to Tour 7. In the GENEXP category, 38 billets from Tour 3 and 16 billets from Tour 4 were moved to Tour 2, and 12 billets were moved from Tour 5 to Tour 7. Billets in the S/L category were not changed.

After these modifications were made to the Accessions and Billet matrices, some improvement was visible, but feasibility still had not been attained. Overall, there continued to be a shortage of junior officers and an excess of senior officers

In the second phase of the analysis, during which the constraints on leadership billets were relaxed, the opportunity for additional movement of billets increased only slightly. Tours 5, 6 and 7 were the only tours between which

movement of billets improved the filling of billets. Specifically, in the LDRSHP category, six billets from Tour 5 and three billets from Tour 6 were shifted to Tour 7. The revised billet matrix reflecting changes made in both phases of the analysis is shown in Table 4.18. The expected numbers of officers in steady state (completed using new accessions) less the number of hard billets are shown in Table 4.19.

**TABLE 4.18**  
**PERSONNEL/ADMINISTRATION SUB-COMMUNITY**  
**BILLETS (REVISED)**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	24	12	18	21	28	16	7	7	2	2	1
LDRSHP	120	89	99	98	52	22	21	6	5	0	0	0
S/L	0	11	3	3	1	0	0	0	0	0	0	0
GENEXP	5	93	48	70	35	48	20	8	7	3	3	2

TABLE 4.19

## PERSONNEL/ADMINISTRATION SUB-COMMUNITY

EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
 LESS NUMBER OF HARD BILLETS  
 (RELAXED CONSTRAINTS)

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-7	0	0	12	22	23	10	13	11
LDRSHP	0	-80	-41	-44	-2	0	0	5	6	9	4	4
S/L	0	-10	-1	-1	0	0	0	0	0	9	4	4
GENEXP	5	0	0	-26	0	0	8	26	23	16	19	22

NEGATIVE VALUES REFLECT PERSONNEL SHORTAGES.

POSITIVE VALUES REFLECT PERSONNEL EXCESSES.

The results show that, even after the constraints have been lifted to some extent, there is, in general, a shortage of junior officers and an excess of senior officers compared to the available billets in the Personnel/Administration sub-community.

Similar changes were made, as appropriate, to the remaining sub-communities. After both parts of the analysis, when billets were moved wherever possible (as described above) to improve the matching of officers to billets, all sub-communities except Intelligence/NSA continue to show an overall shortage of junior officers, and all six sub-communities show an excess of senior officers. The results, provided in Appendix C, also show that in the Personnel/Administration and Surveillance sub-communities, the junior officer shortage is primarily in the two leadership categories



officer shortage is primarily in the two leadership categories of billets. The Shore Operations/Logistics sub-community has a shortage of junior officers in the leadership categories, and an excess of junior officers in the non-leadership categories; overall, however, there is a shortage of junior officers in the sub-community. The Education and Training sub-community and the Communications/ADP sub-community have junior officer shortages primarily in the non-leadership categories. Also in the Intelligence/NSA sub-community there is a shortage of junior officers in non-leadership billets. However, this shortage is outweighed by a surplus of junior officers in all levels of junior leadership billets, resulting in an overall excess of junior officers in the sub-community. These findings are summarized in Table 4.20. Billets in the first six tours are considered junior officer billets, while billets in the last six tours are considered senior officer billets. Leadership billets in the table are billets in the LDRSHP and S/L categories; non-leadership billets are billets in the SUBSPEC and GENEXP categories.

TABLE 4.20

**STEADY STATE ANALYSIS  
SUMMARY OF RESULTS**

SUB-COMMUNITY	BILLETS					
	Junior Officers			Senior Officers		
	Ldrshp	Non-Ldrshp	Overall	Ldrshp	Non-Ldrshp	Overall
Personnel/Admin	-	-	-	+	+	+
Surveillance	-	-	-	+	+	+
Shore Operations/ Logistics	-	+	-	+	+	+
Education & Training	-	-	-	+	+	+
Communications/ ADP	-	-	-	+	+	+
Intelligence/NSA	+	-	+	+	+	+

- DENOTES PERSONNEL SHORTAGES

+ DENOTES PERSONNEL EXCESSES

The shortage of junior officers (or excess of junior officer billets) can be solved either by increasing the number of officers in the lower ranks (but attriting them prior to Tour 7 in order not to aggravate the problem of excess senior officers), or reducing the number of billets to be filled by GEN URL officers. This would most likely require that other URL communities increase their respective shares of 1000 billets; however, it is beyond the scope of this thesis to determine the feasibility of this approach.

In all six sub-communities, the majority (but not all) of the excess officers within the later tours are in non-leadership categories. Put another way, there is a shortage

In all six sub-communities, the majority (but not all) of the excess officers within the later tours are in non-leadership categories. Put another way, there is a shortage of primarily non-leadership billets for senior officers. This suggests that it is more likely that officers will fulfill leadership requirements than subspecialty requirements as senior officers. However, the lack of leadership billets should not be overlooked as a result of the greater shortage of non-leadership jobs. Further, the lack of SUBSPEC billets is more significant than the lack of GENEXP billets, since the career path requires experience in the former only.

Unless there is increased attrition beginning in Tour 6, more billets of all types, but particularly non-leadership billets, must be made available to senior officers in each sub-community if they are to provide viable career paths for GEN URL officers. The degree to which this is true varies among sub-communities. Increasing the number of billets available to senior GEN URL officers will reduce the number of 1000 billets available to senior officers in other URL communities. The effects of this are not determined here.

In summary, the creation of specialized sub-communities within the GEN URL community in steady state results in an overall shortage of junior officers in all sub-communities except Intelligence/NSA, and an overall excess of senior officers in all sub-communities.

### C. TRANSIENT ANALYSIS

The steady state analysis conducted in Section B above demonstrates that the creation of six sub-communities within the GEN URL community is feasible in the long term if the billet structure is changed to accommodate the steady state flow of officers. The steady state billet matrix, shown in Table 4.21, was computed by adding the entries in the revised billet matrix (Table 4.18) to the corresponding entries in Table 4.19, which displays personnel shortages and excesses as compared to billets after the second phase of steady state forecasting. Assuming that this ideal (i.e., steady state) billet structure is in place, it is still of interest to conduct a short term, or transient, analysis to determine whether or not the current personnel structure could be adjusted to accommodate the billet structure, and if so, how long it would take to do so and what adjustments would be required.

**TABLE 4.21**

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
STEADY STATE AND TRANSIENT  
BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	24	12	11	21	28	28	29	30	12	15	12
LDRSHIP	120	9	58	54	50	22	21	11	11	9	4	4
S/L	0	1	2	2	1	0	0	0	0	9	4	4
GENEXP	10	93	48	44	35	48	28	34	30	19	22	24

Since the billets used in this study were the result of a "snapshot" of the GEN URL community, the current inventory of GEN URL officers has the same structure as the starting billet matrix, shown in Table 4.2. In other words, there is now an excess of junior officers and a shortage of senior officers as compared to the steady state billet matrix in Table 4.21. The vast differences between the personnel and billet inventories make short term feasibility unlikely.

For the transient analysis of the Personnel/Administration sub-community, it was assumed that billets are available as required in steady state and given in Table 4.21. The incumbents matrix was constructed to be the numbers reflecting the officers currently filling Personnel/Administration billets. Initially, this matrix was identical to the original

billet matrix (Table 4.2), but modifications were required to account for officers with proven subspecialties and/or Navy-approved post-graduate degrees (i.e, officers with C, F, M, Q, R or P subspecialty codes). More specifically, 27 officers with proven subspecialties or post-graduate degrees in Personnel/Administration fields who are currently serving in other sub-communities were added to the incumbents matrix in the appropriate billet types and tour numbers. On the other hand, 141 officers serving in Personnel/Administration billets but having proven subspecialties or post-graduate degrees in fields other than Personnel/Administration were removed from the incumbents matrix. The final incumbents matrix is shown in Table 4.22. This method of instantaneously transferring officers to the appropriate sub-community is a simplification of the actual process which in reality would clearly take several quarters to accomplish.

TABLE 4.22

**PERSONNEL/ADMINISTRATION SUB-COMMUNITY  
TRANSIENT ANALYSIS  
INCUMBENTS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	10	21	21	27	27	8	7	8	3	2	1
LDRSHP	14	189	80	80	45	11	12	6	5	1	0	0
S/L	0	11	3	5	1	0	0	0	0	2	0	0
GENEXP	4	39	80	80	36	37	6	6	7	2	2	2

The simplest method of matching officers to billets is to use the steady state distribution of accessions (12 per quarter in LDRSHP billets and one per quarter in GENEXP billets), and make no adjustments to transition probabilities. This permits adherence to the career path without altering the sequence of assignments to leadership and non-leadership billets. After 20 quarters of forecasting, there is an exact match of officers to billets in Tours 1 and 2. An additional ten quarters are required to match billets and officers in Tour 3, and so on. In order to match officers and billets in all 12 tours, 108 quarters (27 years) are required. Obviously, this timeframe is unacceptable.

In an effort to shorten this timeframe, transient analysis was conducted by forecasting for a period of 24 quarters (six years) in four quarter increments, while appropriate

years) in four quarter increments, while appropriate adjustments were made to the numbers of accessions and transition probabilities at each increment. The goal of this analysis was to try to match the numbers of officers and billets in at least the first two tours.

Altering attrition rates was not considered to be an option in this case since increased attrition at the junior officer level would contribute further to the problem of shortages of senior officers. Accessing senior officers from other sub-communities was also eliminated as a means of filling more senior billets due to shortages of senior officers, compared to the steady state billet distribution throughout the GEN URL.

For the first one year increment of forecasting, first tour accessions were increased from 12 to 28 in the LDRSHP category and from one to two in the GENEXP category. In addition, the probabilities of transitioning from a GENEXP billet in Tour 1 to any type of billet in Tour 2 were modified to force all officers leaving a GENEXP tour into either another GENEXP billet or a SUBSPEC billet. This change was required to improve the matching of officers to billets, although it eliminates the opportunity for some officers to complete a Division Officer tour in Tour 2. In the second year of forecasting, accessions were returned to the previous



steady state rate. Transition probabilities remained as they had been for the first year of forecasting.

Similar changes were made for each additional year of forecasting. However, after 24 quarters there was little overall improvement to the matching. There remained an overall excess of officers compared to billets prior to Tour 7 and an overall shortage of officers in later tours.

A means by which to match billets and officers in a shorter period of time is not obvious from the transient analysis. There may actually be faster ways of achieving a perfect match, but they may require actions that are neither permissible nor practical in the management of a community of officers.

In summary, the reorganization of the GEN URL community into specialized sub-communities is theoretically feasible in the long run, as shown in the steady state analysis. However, it is not clear how in the short term feasibility can be accomplished in the manner described in the transient analysis within a reasonably short period of time.

## V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### A. SUMMARY AND CONCLUSIONS

The purpose of this thesis was to analyze the feasibility of a reorganization of the GEN URL community into six specialized sub-communities, all of which have requirements for leadership and subspecialty development. The analysis demonstrated a means by which the GEN URL community can be modeled.

The results of the analysis showed that such a reorganization is feasible in the long term if the billet structure is changed to accommodate the steady state distribution of officers. Specifically, fewer billets would be required for junior officers in all sub-communities except the Intelligence/NSA sub-community, and additional billets required for senior officers throughout the GEN URL.

Transient analysis has demonstrated that it will be extremely difficult to reorganize the current GEN URL inventory of officers in a reasonably short period of time to accommodate the steady state billet structure required for the six sub-communities. This leaves open the possibility that a more gradual approach, in which the numbers of officers and billets change concurrently, may achieve the desired results.

## B. RECOMMENDATIONS

Although the reorganization of the GEN URL community as proposed in this thesis may be impractical or impossible to accomplish in the short term, it may still be advisable that leadership tours and subspecialty tours of all GEN URL officers be as closely related as possible in terms of functional area. This would result in increased utilization of the valuable knowledge and experience of GEN URL officers, as well as greater effectiveness of the community overall.

Several areas in which further study could be conducted have arisen from the analysis conducted here. First, a more gradual approach to the transient analysis could be taken. Rather than assuming a steady state billet structure at the outset, perhaps there should be a more gradual shift to the organization of sub-communities such that personnel and billet inventories change simultaneously.

Another area for further study is the feasibility of variations of the sub-community organization proposed in this thesis. For example, perhaps a portion of the GEN URL community could follow the established career path within specialized sub-communities as described here, and the remaining officers could complete the required leadership and subspecialty tours in several sub-communities, as most GEN URL officers do currently. This differs from the dual-track career path of the mid-late 1980s in that all officers would

have the same requirements for leadership and subspecialty tours regardless of whether or not they are "specialists".

As stated in Chapter IV, Section B, a redistribution of 1000-coded billets to accommodate a reorganization of the GEN URL community will have implications for other URL communities. An assessment of the impact on other communities would be required prior to a redistribution of billets.

The lack of a set of billets designated specifically for GEN URL officers creates problems in effectively modeling the community. Exact requirements in terms of numbers and types of billets that must be filled by GEN URL officers are unclear. Therefore, in order to model the community, critical assumptions must be made with regard to the portion of 1000-coded billets that should be included in any analysis. The consequence is that only trends, rather than actual numbers that result from analyses such as those conducted here, can be used with any confidence in the determination of changes that should be made to the officer structure. These problems carry over into actual management of the community. It is difficult at best to manage a community with no requirements to fill specific billets, and therefore no definitive size for a required personnel inventory. If it is not practical to provide the GEN URL community with a its own set of billets, then at least requirements should be set for numbers of specific types of billets. If the community were organized,

for example, into sub-communities such as those described here, then these requirements could be very specific in terms of sub-community, type of billet (non-leadership vs. leadership), level of leadership (if applicable) and paygrade.

Finally, it is recommended that a review of the assignment of AQD codes, NOBC codes and billet titles be conducted. Numerous discrepancies between billet titles and assigned codes were noted during the data collection segment of this analysis. Depending on the extent to which billets are inaccurately coded or named, the results of such an analysis could be affected.

## APPENDIX A

### ASSIGNMENT OF BILLET CODES TO SUB-COMMUNITIES

#### I. PERSONNEL/ADMINISTRATION SUB-COMMUNITY

##### A. SUBSPECIALTY CODES

XX10 - PUBLIC AFFAIRS  
XX30 - MANAGEMENT (GENERAL)  
XX31 - FINANCIAL MANAGEMENT  
XX33 - MANPOWER/PERSONNEL TRAINING ANALYSIS

##### B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES

1005 - ACCOUNTING OFFICER  
1025 - BUDGET OFFICER  
1045 - DISBURSING OFFICER  
1050 - COMPTROLLER  
1105 - MESS TREASURER  
1112 - BACHELOR QUARTERS MANAGER  
1918 - GENERAL SUPPLY OFFICER  
2155 - NAVAL SCIENCES RESEARCH COORDINATOR/  
ADMINISTRATOR  
2410 - INTRAGOVERNMENTAL INQUIRIES OFFICER  
2412 - PUBLIC AFFAIRS OFFICER  
2445 - RADIO-TELEVISION PROGRAM OFFICER  
2590 - LEGAL ADMINISTRATIVE OFFICER  
2591 - LEGAL OFFICER  
2605 - ADMINISTRATIVE OFFICER  
2610 - MANAGEMENT ANALYSIS & CONTROL OFFICER  
2615 - ADMINISTRATIVE OFFICER  
2617 - POSTAL OFFICER  
2670 - RECORDS MANAGEMENT OFFICER  
3020 - PROCUREMENT & RECRUITING OFFICER  
3035 - INDUCTION & ENLISTMENT OFFICER  
3120 - PERSONNEL CLASSIFICATION OFFICER  
3125 - PERSONNEL DISTRIBUTION OFFICER (GENERAL)  
3126 - PERSONNEL DISTRIBUTION OFFICER (OFFICER)  
3127 - PERSONNEL DISTRIBUTION OFFICER (ENLISTED)  
3320 - HUMAN RESOURCE MANAGEMENT OFFICER  
3330 - EQUAL OPPORTUNITY/RACE RELATIONS PROGRAM  
OFFICER  
3350 - COUNSELING & ASSISTANCE CENTER DIRECTOR  
3412 - BRIG OFFICER  
3415 - DISCIPLINE ADMINISTRATION & REVIEW OFFICER  
3420 - PERSONNEL PERFORMANCE OFFICER (GENERAL)

- 3421 - PERSONNEL PERFORMANCE OFFICER (OFFICER)
- 3422 - PERSONNEL PERFORMANCE OFFICER (ENLISTED)
- 3525 - PERSONAL SERVICES/AFFAIRS OFFICER
- 3535 - SPECIAL SERVICES OFFICER
- 3545 - INTERNAL RELATIONS/MEDIA OFFICER
- 3910 - TRANSIENT PERSONNEL UNIT OFFICER
- 3925 - MILITARY MANPOWER REQUIREMENTS CONTROL OFFICER
- 3943 - MANPOWER PLANNING OFFICER
- 3950 - PERSONNEL RESEARCH OFFICER
- 3965 - PERSONNEL/MANPOWER MANAGEMENT OFFICER
- 3970 - PERSONNEL PLANNING OFFICER
- 3980 - PERSONNEL PLANS & POLICY CHIEF
- 3981 - PERSONNEL PLANS & POLICY DIRECTOR
- 3985 - STAFF PERSONNEL OFFICER
- 8666 - OPERATIONS LOG OFFICER
- 8804 - MOTION PICTURE & TELEVISION PROJECT OFFICER
- 8853 - PHOTOGRAPHIC OFFICER
- 9034 - STAFF ADMINISTRATION OFFICER
- 9052 - MILITARY ASSISTANCE PROGRAMS OFFICER
- 9059 - STAFF LIAISON OFFICER
- 9082 - FLAG SECRETARY
- 9555 - ARMED FORCES COURIER SERVICE OFFICER
- 9935 - AIDE
- 9960 - INSPECTOR GENERAL

## II. SURVEILLANCE SUB-COMMUNITY

### A. SUBSPECIALTY CODES

- XX44 - ANTI-SUBMARINE WARFARE
- XX47 - GEOPHYSICS
- XX49 - OPERATIONAL OCEANOGRAPHY
- XX56 - UNDERWATER ACOUSTICS
- XX75 - SPACE SYSTEMS (GENERAL)
- XX76 - SPACE SYSTEMS OPERATIONS
- XX77 - SPACE SYSTEMS ENGINEERING

### B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES

- 9045 - STAFF OPERATIONS COMMAND CENTER WATCH OFFICER
- 9216 - CIC OFFICER
- 9217 - NAVAL TACTICAL DATA SYSTEM - COMBAT INFORMATION CENTER OFFICER
- 9227 - NTDS - CIC WATCH OFFICER, SURFACE/SUBSURFACE OPERATIONS
- 9464 - OCEAN SYSTEMS OPERATIONS OFFICER
- 9465 - OCEAN SYSTEMS WATCH OFFICER

**C. ADDITIONAL QUALIFICATION DESIGNATOR (AQD) CODES**

BA4/5 - INTEGRATED UNDERSEA SURVEILLANCE SYSTEMS  
(IUSS)

**III. SHORE OPERATIONS/LOGISTICS SUB-COMMUNITY**

**A. SUBSPECIALTY CODES**

XX32 - MATERIAL LOGISTICS SUPPORT MANAGEMENT  
XX35 - TRANSPORTATION MANAGEMENT  
XX43 - OPERATIONAL LOGISTICS

**B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES**

1215 - CARGO HANDLING OFFICER  
1242 - PASSENGER TRANSPORTATION OFFICER  
1272 - TRANSPORTATION LOGISTICS OFFICER  
1295 - TRANSPORTATION DIRECTOR  
1978 - SUPPLY LOGISTICS OFFICER  
2715 - DISASTER PREPAREDNESS OFFICER  
2740 - SAFETY ENGINEER  
2750 - SECURITY OFFICER, STAFF  
2775 - SECURITY OFFICER, SHORE ACTIVITY  
4215 - FACILITIES PLANNING & PROGRAMMING OFFICER  
4230 - FACILITIES CONSTRUCTION/FACILITIES SERVICES  
OFFICER  
8668 - OPERATIONS OFFICER, AVIATION SHORE ACTIVITY  
9038 - STAFF SPECIAL PROJECTS OPERATIONS OFFICER  
9063 - STAFF MATERIAL OFFICER  
9051 - LOGISTICS OFFICER  
9293 - SEA-AIR-LAND OFFICER  
9442 - FACILITIES MANAGER  
9466 - OPERATIONS OFFICER, ASHORE  
9470 - COMMANDING OFFICER, MILITARY SEALIFT COMMAND  
OFFICE  
9476 - PORT SERVICES OFFICER

**IV. EDUCATION AND TRAINING SUB-COMMUNITY**

**A. SUBSPECIALTY CODES**

XX00 - ANY DISCIPLINE  
XX11 - HUMANITIES (ENGLISH)  
XX12 - HUMANITIES (HISTORY)  
XX37 - EDUCATION AND TRAINING MANAGEMENT



**B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES**

3215 - EDUCATION/TRAINING PLANNING & PROGRAM OFFICER  
(GENERAL)  
3230 - EDUCATIONAL SERVICES OFFICER  
3236 - GROUND SCHOOL INSTRUCTOR  
3240 - OFFICER CANDIDATE COMPANY OFFICER  
3242 - INDOCTRINATION TRAINING OFFICER  
3245 - INSTRUCTOR, GENERAL  
3250 - INSTRUCTOR, TECHNICAL  
3251 - INSTRUCTOR, ACADEMIC  
3255 - INSTRUCTOR, ACADEMIC (PHYSICAL SCIENCE)  
3262 - INSTRUCTOR TRAINING OFFICER  
3265 - ADVANCED COMMAND & STAFF SCHOOL INSTRUCTOR  
3270 - INSTRUCTOR, NAVAL SCIENCE  
3274 - PHYSICAL TRAINING OFFICER  
3277 - PROFESSOR OF NAVAL SCIENCE  
3283 - SCHOOL ADMINISTRATOR  
3290 - TRAINING OFFICER  
9067 - STAFF READINESS OFFICER (GENERAL)  
9070 - STAFF READINESS OFFICER (ENGINEERING)

**V. COMMUNICATIONS/ADP SUB-COMMUNITY**

**A. SUBSPECIALTY CODES**

XX45 - COMMAND AND CONTROL  
XX80 - COMMUNICATIONS (GENERAL)  
XX81 - COMMUNICATIONS (ENGINEERING)  
XX82 - COMMUNICATIONS SYSTEMS TECHNOLOGY  
XX90 - COMPUTER TECHNOLOGY (GENERAL)  
XX91 - COMPUTER SCIENCE  
XX95 - COMPUTER SYSTEMS TECHNOLOGY

**B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES**

2612 - MANAGEMENT INFORMATION SYSTEMS OFFICER  
2614 - MANAGEMENT INFORMATION CENTER OFFICER  
2748 - SECURITY MANAGER, INFORMATION SECURITY PROGRAM  
5917 - ELECTRONIC EQUIPMENT RESEARCH OFFICER (GENERAL)  
9060 - STAFF COMMAND & CONTROL OFFICER  
9510 - COMMUNICATION OFFICER, ASHORE  
9515 - COMMUNICATION PLANS & OPERATIONS OFFICER  
9517 - COMMUNICATION SECURITY OFFICER  
9535 - CUSTODIAN OF CMS MATERIAL  
9560 - SATELLITE COMMUNICATIONS OFFICER  
9567 - RADIO STATION OFFICER

- 9575 - CIRCUIT CONTROL OFFICER
- 9580 - COMMUNICATIONS SECURITY MATERIAL ISSUING OFFICER
- 9590 - STAFF COMMUNICATIONS OFFICER
- 9595 - COMMUNICATIONS TRAFFIC OFFICER
- 9705 - ADP SYSTEM DIRECTOR
- 9710 - ADP PROGRAMS OFFICER
- 9715 - ADP PRODUCTION OFFICER
- 9720 - ADP PLANS OFFICER
- 9730 - DATA BASE MANAGEMENT OFFICER
- 9735 - COMPUTER SYSTEMS ANALYST
- 9740 - DIGITAL COMPUTER SYSTEM PROGRAMMER
- 9781 - ADP SYSTEMS SECURITY OFFICER

## **VI. INTELLIGENCE/NSA SUB-COMMUNITY**

### **A. SUBSPECIALTY CODES**

- XX16 - JOINT INTELLIGENCE
- XX17 - NAVAL INTELLIGENCE
- XX20 - GENERAL POLITICAL SCIENCE
- XX21 - MID EAST, AFRICA, OR SOUTH ASIA
- XX22 - FAR EAST, SOUTH EAST ASIA, PACIFIC
- XX24 - EUROPE/USSR
- XX25 - INTERNATIONAL NEGOTIATIONS
- XX26 - STRATEGIC PLANNING (GENERAL)
- XX27 - STRATEGIC PLANNING (NUCLEAR)

### **B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES**

- 9600 - INTELLIGENCE OFFICER, BASIC
- 9616 - INTELLIGENCE SUPPORT OFFICER
- 9617 - INTELLIGENCE INVESTIGATIONS OFFICER
- 9620 - GEOGRAPHIC AREA INTELLIGENCE OFFICER
- 9640 - OPERATIONAL INTELLIGENCE OFFICER (GENERAL)
- 9660 - SCIENTIFIC & TECHNICAL INTELLIGENCE OFFICER
- 9670 - OPERATIONAL INTELLIGENCE OFFICER (MANAGEMENT)
- 9680 - OPERATIONAL INTELLIGENCE OFFICER (ANALYST)
- 9683 - PHOTOGRAPHIC INTELLIGENCE OFFICER
- 9684 - MULTISENSOR INTELLIGENCE OFFICER
- 9686 - ANTISUBMARINE WARFARE INTELLIGENCE OFFICER

**VII. ALL SUB-COMMUNITIES**

**A. SUBSPECIALTY CODES**

XX42 - OPERATIONS ANALYSIS

**B. NAVY OFFICER BILLET CLASSIFICATION (NOBC) CODES**

2085 - STATISTICAL DATA ANALYST  
9015 - CHIEF OF STAFF  
9016 - CHIEF STAFF OFFICER  
9065 - STAFF OPERATIONS & PLANS OFFICER  
9085 - OPERATIONS ANALYST  
9087 - STAFF PLANS OFFICER  
9420 - OFFICER IN CHARGE, NAVAL SHORE ACTIVITY  
9421 - COMMANDER/COMMANDING OFFICER, SHORE ACTIVITY  
9422 - COMMANDING OFFICER, NAVAL SHORE ACTIVITY  
(SELECTED)  
9436 - EXECUTIVE OFFICER, SHORE ACTIVITY  
9930 - EXECUTIVE ASSISTANT  
9970 - PLANS & POLICIES CHIEF  
9980 - PLANS & POLICIES DIRECTOR  
9981 - NAVAL PLANS & POLICIES DIRECTOR, NAVAL COMMAND  
SYSTEMS

## APPENDIX B

### STARTING VALUES FOR PARAMETERS

#### I. PERSONNEL/ADMINISTRATION SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	10	22	22	29	28	8	7	7	2	2	1
LDRSHP	17	192	99	98	58	25	12	6	5	0	0	0
S/L	0	11	3	3	1	0	0	0	0	0	0	0
GENEXP	5	39	86	86	47	48	8	8	7	3	3	2

##### ACCESSIONS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	10	0	0	0	0	0	0	0	0	0	0	0
S/L	0	0	0	0	0	0	0	0	0	0	0	0
GENEXP	3	0	0	0	0	0	0	0	0	0	0	0

**TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.924	0.053	0.000
LDRSHP	0.199	0.000	0.000	0.778
S/L	0.199	0.000	0.000	0.778
GENEXP	0.000	0.924	0.053	0.000

**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.097	0.460	0.014	0.377
LDRSHP	0.097	0.460	0.014	0.377
S/L	0.097	0.460	0.014	0.377
GENEXP	0.097	0.460	0.014	0.377

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.900	0.028	0.000
LDRSHP	0.189	0.000	0.000	0.739
S/L	0.189	0.000	0.000	0.739
GENEXP	0.000	0.900	0.028	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.191	0.447	0.008	0.309
LDRSHP	0.191	0.447	0.008	0.309
S/L	0.191	0.447	0.008	0.309
GENEXP	0.191	0.447	0.008	0.309

**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.192	0.390	0.000	0.329
LDRSHP	0.335	0.000	0.000	0.576
S/L	0.335	0.000	0.000	0.576
GENEXP	0.192	0.390	0.000	0.329

**TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.355	0.275	0.000	0.354
LDRSHP	0.355	0.275	0.000	0.354
S/L	0.355	0.275	0.000	0.354
GENEXP	0.355	0.275	0.000	0.354

**TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.359	0.194	0.000	0.410
LDRSHP	0.450	0.000	0.000	0.513
S/L	0.450	0.000	0.000	0.513
GENEXP	0.359	0.194	0.000	0.410

**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.401	0.170	0.000	0.400
LDRSHP	0.486	0.000	0.000	0.485
S/L	0.486	0.000	0.000	0.485
GENEXP	0.401	0.170	0.000	0.400

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.174	0.125	0.125	0.260
LDRSHP	0.174	0.125	0.125	0.260
S/L	0.174	0.125	0.125	0.260
GENEXP	0.174	0.125	0.125	0.260

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.258	0.144	0.144	0.387
LDRSHP	0.373	0.000	0.000	0.560
S/L	0.373	0.000	0.000	0.560
GENEXP	0.258	0.144	0.144	0.387

**TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.252	0.122	0.122	0.504
LDRSHP	0.333	0.000	0.000	0.667
S/L	0.333	0.000	0.000	0.667
GENEXP	0.252	0.122	0.122	0.504



## II. SURVEILLANCE SUB-COMMUNITY

### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	5	5	12	12	9	10	1	1	0	0	0	0
LDRSHP	3	12	2	1	1	0	1	0	0	0	0	0
S/L	15	64	12	7	6	3	1	1	1	1	0	0
GENEXP	0	2	4	3	1	1	1	0	0	0	0	0

### ACCESSIONS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	1	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	0	0	0	0	0	0	0	0	0	0	0	0
S/L	1	0	0	0	0	0	0	0	0	0	0	0
GENEXP	0	0	0	0	0	0	0	0	0	0	0	0

**TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.156	0.821	0.000
LDRSHP	0.801	0.000	0.000	0.176
S/L	0.801	0.000	0.000	0.176
GENEXP	0.000	0.156	0.821	0.000

**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.273	0.085	0.522	0.068
LDRSHP	0.273	0.085	0.522	0.068
S/L	0.273	0.085	0.522	0.068
GENEXP	0.273	0.085	0.522	0.068

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.116	0.812	0.000
LDRSHP	0.742	0.000	0.000	0.186
S/L	0.742	0.000	0.000	0.185
GENEXP	0.000	0.116	0.812	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.455	0.064	0.391	0.045
LDRSHP	0.455	0.064	0.391	0.045
S/L	0.455	0.064	0.391	0.045
GENEXP	0.455	0.064	0.391	0.045

**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.469	0.000	0.390	0.052
LDRSHP	0.820	0.000	0.000	0.091
S/L	0.820	0.000	0.000	0.091
GENEXP	0.469	0.000	0.390	0.052

**TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.355	0.137	0.138	0.354
LDRSHP	0.355	0.137	0.138	0.354
S/L	0.355	0.137	0.138	0.354
GENEXP	0.355	0.137	0.138	0.354

**TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.769	0.000	0.194	0.000
LDRSHP	0.963	0.000	0.000	0.000
S/L	0.963	0.000	0.000	0.000
GENEXP	0.769	0.000	0.194	0.000

**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.401	0.000	0.170	0.400
LDRSHP	0.486	0.000	0.000	0.485
S/L	0.486	0.000	0.000	0.485
GENEXP	0.401	0.000	0.170	0.400

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.217	0.000	0.250	0.217
LDRSHP	0.217	0.000	0.250	0.217
S/L	0.217	0.000	0.250	0.217
GENEXP	0.217	0.000	0.250	0.217

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.323	0.144	0.144	0.322
LDRSHP	0.467	0.000	0.000	0.466
S/L	0.467	0.000	0.000	0.466
GENEXP	0.323	0.144	0.144	0.322

TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.378	0.122	0.122	0.378
LDRSHP	0.500	0.000	0.000	0.500
S/L	0.500	0.000	0.000	0.500
GENEXP	0.378	0.122	0.122	0.378

### III. SHORE OPERATIONS/LOGISTICS SUB-COMMUNITY

#### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	1	2	5	4	1	0	0	1	0	0
LDRSHP	1	21	8	8	12	5	1	1	0	0	0	0
S/L	0	3	4	3	2	0	1	0	0	0	0	0
GENEXP	1	3	7	7	6	6	2	1	1	0	0	0

#### ACCESSIONS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	1	0	0	0	0	0	0	0	0	0	0	0
S/L	0	0	0	0	0	0	0	0	0	0	0	0
GENEXP	2	0	0	0	0	0	0	0	0	0	0	0

#### TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.855	0.122	0.000
LDRSHP	0.000	0.000	0.000	0.977
S/L	0.000	0.000	0.000	0.977
GENEXP	0.000	0.855	0.122	0.000

**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.059	0.316	0.158	0.415
LDRSHP	0.059	0.316	0.158	0.415
S/L	0.059	0.316	0.158	0.415
GENEXP	0.059	0.316	0.158	0.415

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.675	0.253	0.000
LDRSHP	0.206	0.000	0.000	0.722
S/L	0.206	0.000	0.000	0.722
GENEXP	0.000	0.675	0.253	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.228	0.390	0.065	0.272
LDRSHP	0.228	0.390	0.065	0.272
S/L	0.228	0.390	0.065	0.272
GENEXP	0.228	0.390	0.065	0.272

TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.208	0.390	0.000	0.313
LDRSHP	0.364	0.000	0.000	0.547
S/L	0.364	0.000	0.000	0.547
GENEXP	0.208	0.390	0.000	0.213

TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.236	0.138	0.137	0.473
LDRSHP	0.236	0.138	0.137	0.473
S/L	0.236	0.138	0.137	0.173
GENEXP	0.236	0.138	0.137	0.473

TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.194	0.000	0.769
LDRSHP	0.000	0.000	0.000	0.963
S/L	0.000	0.000	0.000	0.963
GENEXP	0.000	0.194	0.000	0.769



**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.085	0.085	0.801
LDRSHP	0.000	0.000	0.000	0.971
S/L	0.000	0.000	0.000	0.971
GENEXP	0.000	0.085	0.085	0.801

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.434	0.125	0.125	0.000
LDRSHP	0.434	0.125	0.125	0.000
S/L	0.434	0.125	0.125	0.000
GENEXP	0.434	0.125	0.125	0.000

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.323	0.144	0.144	0.322
LDRSHP	0.467	0.000	0.000	0.466
S/L	0.467	0.000	0.000	0.466
GENEXP	0.323	0.144	0.144	0.322

TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.378	0.122	0.122	0.378
LDRSHP	0.500	0.000	0.000	0.500
S/L	0.500	0.000	0.000	0.500
GENEXP	0.378	0.122	0.122	0.378

#### IV. EDUCATION AND TRAINING SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	2	14	13	14	14	2	2	1	1	1	0
LDRSHP	5	29	3	2	3	1	0	0	0	0	0	0
S/L	0	14	4	5	7	3	3	1	1	1	0	0
GENEXP	5	7	21	20	6	5	3	3	2	1	0	0

##### ACCESSIONS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	1	0	0	0	0	0	0	0	0	0	0	0
S/L	0	0	0	0	0	0	0	0	0	0	0	0
GENEXP	1	0	0	0	0	0	0	0	0	0	0	0

##### TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.658	0.319	0.000
LDRSHP	0.217	0.000	0.000	0.760
S/L	0.217	0.000	0.000	0.760
GENEXP	0.000	0.658	0.319	0.000

**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.190	0.178	0.296	0.284
LDRSHP	0.190	0.178	0.296	0.284
S/L	0.190	0.178	0.296	0.284
GENEXP	0.190	0.178	0.296	0.284

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.265	0.663	0.000
LDRSHP	0.366	0.000	0.000	0.562
S/L	0.366	0.000	0.000	0.562
GENEXP	0.000	0.265	0.663	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.350	0.137	0.318	0.150
LDRSHP	0.350	0.137	0.318	0.150
S/L	0.350	0.137	0.318	0.150
GENEXP	0.350	0.137	0.318	0.150

**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.384	0.098	0.292	0.137
LDRSHP	0.671	0.000	0.000	0.240
S/L	0.671	0.000	0.000	0.240
GENEXP	0.384	0.098	0.292	0.137

**TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.284	0.000	0.275	0.425
LDRSHP	0.284	0.000	0.275	0.425
S/L	0.284	0.000	0.275	0.425
GENEXP	0.284	0.000	0.275	0.425

**TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.308	0.000	0.194	0.461
LDRSHP	0.385	0.000	0.000	0.578
S/L	0.385	0.000	0.000	0.578
GENEXP	0.308	0.000	0.194	0.461

**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.267	0.000	0.170	0.534
LDRSHP	0.323	0.000	0.000	0.648
S/L	0.323	0.000	0.000	0.648
GENEXP	0.267	0.000	0.170	0.534

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.217	0.000	0.250	0.217
LDRSHP	0.217	0.000	0.250	0.217
S/L	0.217	0.000	0.250	0.217
GENEXP	0.217	0.000	0.250	0.217

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.645	0.144	0.144	0.000
LDRSHP	0.933	0.000	0.000	0.000
S/L	0.933	0.000	0.000	0.000
GENEXP	0.645	0.144	0.144	0.000

TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.378	0.122	0.122	0.378
LDRSHP	0.500	0.000	0.000	0.500
S/L	0.500	0.000	0.000	0.500
GENEXP	0.378	0.122	0.122	0.378

# **V. COMMUNICATIONS/ADP SUB-COMMUNITY**

## **BILLETS**

<b>BILLET TYPES</b>	<b>TOUR NUMBERS</b>											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	6	40	39	38	38	8	8	7	1	1	0
LDRSHP	2	29	2	1	2	1	1	0	0	0	0	0
S/L	2	52	7	7	13	6	2	1	1	0	0	0
GENEXP	1	12	23	24	10	9	5	5	5	0	0	0

## **ACCESSIONS**

<b>BILLET TYPES</b>	<b>TOUR NUMBERS</b>											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	3	0	0	0	0	0	0	0	0	0	0	0
S/L	3	0	0	0	0	0	0	0	0	0	0	0
GENEXP	2	0	0	0	0	0	0	0	0	0	0	0

## **TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2**

<b>ACTIVITIES</b>	<b>SUBSPEC</b>	<b>LDRSHP</b>	<b>S/L</b>	<b>GENEXP</b>
SUBSPEC	0.000	0.350	0.627	0.000
LDRSHP	0.325	0.000	0.000	0.652
S/L	0.325	0.000	0.000	0.652
GENEXP	0.000	0.350	0.627	0.000



**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.300	0.105	0.370	0.173
LDRSHP	0.300	0.105	0.370	0.173
S/L	0.300	0.105	0.370	0.173
GENEXP	0.300	0.105	0.370	0.173

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.116	0.812	0.000
LDRSHP	0.574	0.000	0.000	0.354
S/L	0.574	0.000	0.000	0.354
GENEXP	0.000	0.116	0.812	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.396	0.061	0.394	0.104
LDRSHP	0.396	0.061	0.394	0.104
S/L	0.396	0.061	0.394	0.104
GENEXP	0.396	0.061	0.394	0.104

**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.421	0.056	0.334	0.100
LDRSHP	0.737	0.000	0.000	0.174
S/L	0.737	0.000	0.000	0.174
GENEXP	0.421	0.056	0.334	0.100

**TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.436	0.092	0.183	0.273
LDRSHP	0.436	0.092	0.183	0.273
S/L	0.436	0.092	0.183	0.273
GENEXP	0.436	0.092	0.183	0.273

**TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.473	0.000	0.194	0.296
LDRSHP	0.592	0.000	0.000	0.371
S/L	0.592	0.000	0.000	0.371
GENEXP	0.473	0.000	0.194	0.296

**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

<b>ACTIVITIES</b>	<b>SUBSPEC</b>	<b>LDRSHP</b>	<b>S/L</b>	<b>GENEXP</b>
SUBSPEC	0.467	0.000	0.170	0.334
LDRSHP	0.566	0.000	0.000	0.405
S/L	0.566	0.000	0.000	0.405
GENEXP	0.467	0.000	0.170	0.334

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

<b>ACTIVITIES</b>	<b>SUBSPEC</b>	<b>LDRSHP</b>	<b>S/L</b>	<b>GENEXP</b>
SUBSPEC	0.434	0.125	0.125	0.000
LDRSHP	0.434	0.125	0.125	0.000
S/L	0.434	0.125	0.125	0.000
GENEXP	0.434	0.125	0.125	0.000

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

<b>ACTIVITIES</b>	<b>SUBSPEC</b>	<b>LDRSHP</b>	<b>S/L</b>	<b>GENEXP</b>
SUBSPEC	0.645	0.144	0.144	0.000
LDRSHP	0.933	0.000	0.000	0.000
S/L	0.933	0.000	0.000	0.000
GENEXP	0.645	0.144	0.144	0.000

TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.756	0.122	0.122	0.000
LDRSHP	1.000	0.000	0.000	0.000
S/L	1.000	0.000	0.000	0.000
GENEXP	0.756	0.122	0.122	0.000

# VI. INTELLIGENCE/NATIONAL SECURITY AFFAIRS SUB-COMMUNITY

## BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	1	2	14	15	13	7	7	4	3	1	1	0
LDRSHP	0	2	1	0	0	0	0	0	0	0	0	0
S/L	1	8	0	1	0	0	1	0	0	0	0	0
GENEXP	6	5	12	11	4	2	0	0	0	1	0	0

## ACCESSIONS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	0	0	0	0	0	0
LDRSHP	0	0	0	0	0	0	0	0	0	0	0	0
S/L	1	0	0	0	0	0	0	0	0	0	0	0
GENEXP	1	0	0	0	0	0	0	0	0	0	0	0

## TRANSITION PROBABILITIES: TOUR 1 TO TOUR 2

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.195	0.782	0.000
LDRSHP	0.279	0.000	0.000	0.698
S/L	0.279	0.000	0.000	0.698
GENEXP	0.000	0.195	0.782	0.000

**TRANSITION PROBABILITIES: TOUR 2 TO TOUR 3**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.255	0.474	0.000	0.219
LDRSHP	0.255	0.474	0.000	0.219
S/L	0.255	0.474	0.000	0.219
GENEXP	0.255	0.474	0.000	0.219

**TRANSITION PROBABILITIES: TOUR 3 TO TOUR 4**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.000	0.000	0.928	0.000
LDRSHP	0.535	0.000	0.000	0.393
S/L	0.535	0.000	0.000	0.393
GENEXP	0.000	0.000	0.928	0.000

**TRANSITION PROBABILITIES: TOUR 4 TO TOUR 5**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.383	0.228	0.227	0.117
LDRSHP	0.383	0.228	0.227	0.117
S/L	0.383	0.228	0.227	0.117
GENEXP	0.383	0.228	0.227	0.117

**TRANSITION PROBABILITIES: TOUR 5 TO TOUR 6**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.405	0.195	0.195	0.116
LDRSHP	0.709	0.000	0.000	0.202
S/L	0.709	0.000	0.000	0.202
GENEXP	0.405	0.195	0.195	0.116

**TRANSITION PROBABILITIES: TOUR 6 TO TOUR 7**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.709	0.000	0.275	0.000
LDRSHP	0.709	0.000	0.275	0.000
S/L	0.709	0.000	0.275	0.000
GENEXP	0.709	0.000	0.275	0.000

**TRANSITION PROBABILITIES: TOUR 7 TO TOUR 8**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.769	0.097	0.097	0.000
LDRSHP	0.963	0.000	0.000	0.000
S/L	0.963	0.000	0.000	0.000
GENEXP	0.769	0.097	0.097	0.000

**TRANSITION PROBABILITIES: TOUR 8 TO TOUR 9**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.801	0.085	0.085	0.000
LDRSHP	0.971	0.000	0.000	0.000
S/L	0.971	0.000	0.000	0.000
GENEXP	0.801	0.085	0.085	0.000

**TRANSITION PROBABILITIES: TOUR 9 TO TOUR 10**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.217	0.125	0.125	0.217
LDRSHP	0.217	0.125	0.125	0.217
S/L	0.217	0.125	0.125	0.217
GENEXP	0.217	0.125	0.125	0.217

**TRANSITION PROBABILITIES: TOUR 10 TO TOUR 11**

ACTIVITIES	SUBSPEC	LDRSHP	S/L	GENEXP
SUBSPEC	0.645	0.144	0.144	0.000
LDRSHP	0.933	0.000	0.000	0.000
S/L	0.933	0.000	0.000	0.000
GENEXP	0.645	0.144	0.144	0.000



**TRANSITION PROBABILITIES: TOUR 11 TO TOUR 12**

<b>ACTIVITIES</b>	<b>SUBSPEC</b>	<b>LDRSHP</b>	<b>S/L</b>	<b>GENEXP</b>
SUBSPEC	0.378	0.122	0.122	0.378
LDRSHP	0.500	0.000	0.000	0.500
S/L	0.500	0.000	0.000	0.500
GENEXI	0.378	0.122	0.122	0.378

## APPENDIX C

### STEADY STATE RESULTS

#### I. PERSONNEL/ADMINISTRATION SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	24	12	18	21	28	16	7	7	2	2	1
LDRSHP	120	89	99	98	52	22	21	6	5	0	0	0
S/L	0	11	3	3	1	0	0	0	0	0	0	0
GENEXP	5	93	48	70	35	48	20	8	7	3	3	2

#### EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS LESS NUMBER OF HARD BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-7	0	0	12	22	23	10	13	11
LDRSHP	0	-80	-41	-44	-2	0	0	5	6	9	4	4
S/L	0	-10	-1	-1	0	0	0	0	0	9	4	4
GENEXP	5	0	0	-26	0	0	8	26	23	16	19	22

#### II. SURVEILLANCE SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-2	0	0	2	9	5	2	3	3
LDRSHP	-3	-10	0	0	0	0	1	0	0	0	1	1
S/L	-5	-56	-2	0	-1	0	1	1	1	2	1	1
GENEXP	0	0	-3	-1	1	0	2	0	5	2	3	3

**EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
LESS NUMBER OF HARD BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-2	0	0	2	9	5	2	3	3
LDRSHP	-3	-10	0	0	0	0	1	0	0	0	1	1
S/L	-5	-56	-2	0	-1	0	1	1	1	2	1	1
GENEXP	0	0	-3	-1	1	0	2	0	5	2	3	3

**III. SHORE OPERATIONS/LOGISTICS SUB-COMMUNITY**

**BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-2	0	0	2	9	5	2	3	3
LDRSHP	-3	-10	0	0	0	0	1	0	0	0	1	1
S/L	-5	-56	-2	0	-1	0	1	1	1	2	1	1
GENEXP	0	0	-3	-1	1	0	2	0	5	2	3	3

**EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
LESS NUMBER OF HARD BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	-2	0	0	2	9	5	2	3	3
LDRSHP	-3	-10	0	0	0	0	1	0	0	0	1	1
S/L	-5	-56	-2	0	-1	0	1	1	1	2	1	1
GENEXP	0	0	-3	-1	1	0	2	0	5	2	3	3

#### IV. EDUCATION AND TRAINING SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	1	2	4	5	1	0	0	1	0	0
LDRSHP	11	11	8	8	12	4	2	1	0	0	0	0
S/L	0	3	4	3	2	0	1	0	0	0	0	0
GENEXP	1	3	7	7	5	7	2	1	1	0	0	0

#### EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS LESS NUMBER OF HARD BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	0	0	0	0	2	0	0	4	3	3
LDRSHP	-1	-2	-2	-2	-5	-1	0	1	1	1	1	1
S/L	0	-2	-1	-1	-1	0	1	0	1	1	1	1
GENEXP	9	7	1	0	0	0	4	9	8	0	3	3

#### V. COMMUNICATIONS/ADP SUB-COMMUNITY

##### BILLETS

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	13	33	39	38	26	13	15	7	1	1	0
LDRSHP	20	8	5	1	2	1	1	0	0	0	0	0
S/L	20	23	18	7	13	6	2	1	1	0	0	0
GENEXP	10	26	8	16	7	6	8	8	5	0	0	0

**EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
LESS NUMBER OF HARD BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	-18	-26	-21	-3	0	0	7	11	13	14
LDRSHP	0	-5	0	2	1	0	2	0	0	3	2	2
S/L	0	-17	0	12	4	1	3	3	3	3	2	2
GENEXP	0	0	0	-8	-3	0	0	1	5	0	0	0

**VI. INTELLIGENCE/NSA SUB-COMMUNITY**

**BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	3	14	15	10	9	8	4	3	1	1	0
LDRSHP	0	4	1	0	0	0	0	0	0	0	0	0
S/L	5	2	0	1	0	0	1	0	0	0	0	0
GENEXP	10	7	6	11	4	3	0	0	0	1	0	0

**EXPECTED NUMBER OF OFFICERS IN 108 QUARTERS  
LESS NUMBER OF HARD BILLETS**

BILLET TYPES	TOUR NUMBERS											
	1	2	3	4	5	6	7	8	9	10	11	12
SUBSPEC	0	0	-9	-10	-3	0	0	6	6	1	5	3
LDRSHP	0	0	8	0	4	2	0	1	1	1	1	1
S/L	5	4	0	8	4	2	2	1	1	1	1	1
GENEXP	0	0	-2	-7	-2	0	0	0	0	1	0	3

### LIST OF REFERENCES

1. The Naval Officer's Career Planning Guidebook (Draft) (NAVPERS 15605), 1990.
2. "Navy Study Group's Report on Progress of Women in the Navy" (December 5, 1987).
3. Milch, Paul R., "An Analytical Model for Forecasting Navy Officer Career Paths," Technical Report #NPS55-88-009, Naval Postgraduate School, Monterey, CA, 1988.
4. Johnson, Joseph L., Jr., "Analysis of the Joint Reorganization Act's Impact on Personnel Flow in the Surface Warfare Officer Community," Master's Thesis, Naval Postgraduate School, Monterey, CA, 1989.
5. Drescher, Richard B., "The Effect of the Goldwater-Nichols Department of Defense Reorganization Act on Tactical Aviation Pilot and NFO Career Paths," Master's Thesis, Naval Postgraduate School, Monterey, CA, 1989.
6. Milch, Paul R., "FORECASTER, A Markovian Model to Analyze the Distribution of Naval Officers," Technical Report #NPS55-90-07, Naval Postgraduate School, Monterey, CA, 1990.